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Surveillance and Control of Communicable Diseases: Guidelines for Public Health Services in Georgia

Third Edition, November 2005

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Ministry of Labor, Health and Social Affairs of Georgia

National Center for Disease Control

With technical support provided by:

Partners for Health Reform*plus*

Curatio International Foundation

World Health Organization/ European Regional Bureau

Ministry of Labor, Health and Social Affairs
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World Health Organization

Curatio International Foundation

This document was produced by PHR*plus* with funding from the US Agency for International Development (USAID) under Project No. 936-5974.13, Contract No. HRN-C-00-00-00019-00 and is in the public domain. The ideas and opinions in this document are the authors' and do not necessarily reflect those of USAID or its employees. Interested parties may use the report in part or whole, providing they maintain the integrity of the report and do not misrepresent its findings or present the work as their own. This and other HFS, PHR, and PHR*plus* documents can be viewed and downloaded on the project website, www.PHRplus.org.

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- *Implementation of appropriate health system reform.*
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- *Design and implementation of health information systems for disease surveillance.*
- *Delivery of quality services by health workers.*
- *Availability and appropriate use of health commodities.*

Third Edition, November 2005

Recommended Citation

Ministry of Labor, Health and Social Affairs of Georgia and National Center for Disease Control. November 2005. *Surveillance and Control of Communicable Diseases: Guidelines for Public Health Services in Georgia.* Third Edition. Bethesda, MD: The Partners for Health Reform*plus* Project, Abt Associates Inc.

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Contract/Project No.: HRN-C-00-00-00019-00

Submitted to: USAID/ Caucasus

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Abstract

The Georgian National Health Policy, adopted in 1999, declares the reduction of communicable and socially dangerous diseases a major priority for maintaining and improving the health of the Georgian population over the next decade. Uniform and comprehensive guidelines for health workers who deal with infectious disease surveillance are a critical component of ensuring the effective functioning of the surveillance system.

The guidelines outlined in this report offer a comprehensive document to help Georgian health workers comply with the above goal. The guidelines outline how to: identify and register cases of infectious diseases; confirm and classify cases; notify and report; analyze data; investigate outbreaks; and utilize available information for making decisions to prevent and control infectious diseases and improve the functioning of the surveillance system. They are designed primarily for health personnel working at rayon and regional centers of public health. Besides the general norms for the surveillance system as a whole, the guidelines include 14 disease-specific sections devoted exclusively to guiding public health workers for effective prevention and control of priority vaccine-preventable, diarrheal, and other infectious diseases.

This third edition of the guidelines includes additional chapters on diarrheal diseases and bacterial meningitis as well as a number of modifications and improvements suggested by an expert group that coordinated nationwide adoption of surveillance reforms in Georgia in 2004-2005 and WHO/EURO technical experts. The new chapters might need to be refined based on the results and feedback from the implementation of the new guidelines in practice.

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Acronyms

AFP	Acute Flaccid Paralysis
ARI	Acute Respiratory Infection
BCG	Bacillus, Calmette and Guerin Vaccine
CFR	Case Fatality Rate
CIF	Curatio International Foundation
CNS	Central Nervous System
CPH	Center of Public Health
CRS	Congenital Rubella Syndrome
CSF	Cerebral Spinal Fluid
DPT	Diphtheria, Pertussis and Tetanus Vaccine
DT	Diphtheria and Tetanus Toxoid Combination
HBsAg	Hepatitis B Surface Antigen
ICD	International Classification of Diseases
IgM	Immune Globulin M
MMR	Measles, Mumps and Rubella Vaccine
MoLHSA	Ministry of Labor, Health and Social Affairs
MR	Measles and Rubella Vaccine
NCDC	National Center for Disease Control
NID	National Immunization Day
OPV	Oral Poliomyelitis Vaccine
PAU	Polyclinic Ambulatory Unit
PCR	Polymerase Chain Reaction
PHR*plus*	Partners for Health Reform*plus* Project
RIG	Rabies Immunoglobulin
SARS	Severe Acute Respiratory Syndrome
STD	Sexually Transmitted Disease
Td	Diphtheria and Tetanus Toxoid
TT	Tetanus Toxoid
VPD	Vaccine Preventable Disease
VE	Vaccine Efficacy
USAID	United States Agency for International Development
WHO	World Health Organization

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Acknowledgments

The MoLHSA of Georgia and the working group are grateful to the *US Agency for International Development (USAID/Caucasus)* for the opportunity to realize plans on elaboration and introduction of the upgraded surveillance system, to Anton Luchitsky, Lynne Miller Franco, David Mercer, Jim Setzer, Galina Romanyuk of PHR*plus* and Mamuka Djibuti, Ivdity Chikovani, George Gotsadze, Keti Goguadze, Natia Rukhadze of *Curatio International Foundation (CIF)* for their support and technical assistance in this process as well as to George Oblapenko, Mick Mulders, and François-Xavier Hanon of WHO Regional Office for Europe for the technical review of the document.

The production of this manual was funded by USAID under the prime contract No. HRN-C-00-00-00019-00 and subcontract No. 02-011-HPSS-7544.

1. Introduction

Effective communicable disease control relies on functioning high-quality disease surveillance, which is the systematic and regular collection of information on the occurrence, distribution, and trends of an event on an ongoing basis with sufficient accuracy and completeness to provide the basis for action. A well-functioning disease surveillance system therefore provides information for planning, implementation, monitoring, and evaluation of public health programs. It includes case detection and registration, case confirmation, data reporting, data analysis, outbreak investigation, response and preparedness activities, feedback, and communication. Health authorities must also provide appropriate supervision, training, and resources for the surveillance system to operate properly.

The Georgian National Health Policy, adopted in 1999, declares the improvement of maternal and child health and the reduction of communicable and socially dangerous diseases among the main priorities for maintaining and improving the health of the population of Georgia over the next decade (see Table 1). Improved coverage of target populations with immunizations, increased effectiveness of epidemiological surveillance and strengthened community participation are viewed as important strategies to achieve these objectives. The policy links these strategies with the need for improvements of the Georgian Health Information System in order to provide managers, stakeholders, and the public with appropriate information to make correct strategic, tactical, and operational decisions.

These guidelines provide general procedures and standards applicable for all infectious diseases while supplying detailed procedures and strategies for the following ten vaccine preventable diseases (VPDs) and rabies, most of which are targeted for elimination or considerable reduction as outlined in the National Health Policy as well as for other selected priority diseases:

- Diphtheria
- Poliomyelitis
- Measles
- Shigellosis
- Cholera
- Mumps
- Rubella
- Pertussis
- Salmonellosis
- Bacterial meningitis
- Tetanus
- Hepatitis B
- Rabies
- Hepatitis A

Table 1. National Strategies and Targets for the Reduction of VPDs 1999-2009

Disease	Target	Strategies
Poliomyelitis	Maintaining elimination of the disease	▲ 98% coverage of the eligible population with routine immunization ▲ Increase the efficacy and quality of epidemiological surveillance ▲ Strengthening of laboratory services ▲ Supplementary immunization to protect high-risk groups of population
Measles	Elimination by 2007 and certification by 2010	
Tetanus	Elimination of neonatal tetanus by 2005	▲ Provision of relevant conditions for delivery ▲ Immunization of pregnant women if necessary

Disease	Target	Strategies
Diphtheria	Incidence < 0.1 per 100,000 population and no mortality by 2006	▲ 95% coverage of child population by routine immunization ▲ 85% coverage of adult population by revaccination ▲ Improvement of epidemiological surveillance
Hepatitis B	Reduction of the number of new cases by 80%	▲ 95% coverage of infants by immunization ▲ Provision of safe blood and blood products ▲ Provision of safety of medical manipulations ▲ Public education about individual protection ▲ Strengthening of laboratory services
Mumps, Pertussis	Incidence < 0.1 per 100,000 by 2006	▲ 95% coverage of the eligible population with planned immunization ▲ Increase of the effectiveness of epidemiological surveillance ▲ Strengthening of laboratory services
Rubella and CRS	Congenital Rubella Incidence <0.01 per 1000 live births	▲ Increase the efficiency of epidemiological surveillance ▲ Begin planned immunization in 2004 ▲ Strengthening of laboratory services

The following nine chapters of this document provide specific guidance for health workers at all levels with regard to the core functions of surveillance.

2. Identification and Registration of Cases of Infectious and Parasitic Diseases

2.1 Case Detection

An ideal surveillance system is sensitive enough to correctly identify ***all cases*** of a particular disease occurring in the community. Based on the 2002 system assessment, experts estimated that the sensitivity of the Georgian surveillance system for VPDs was at 50 percent, meaning approximately half of all occurring cases were not registered for various reasons, particularly underutilization of health services by population and failure of facilities to "capture" and report cases as required by surveillance protocols. This severely undermines the country's efforts to successfully control these diseases and eventually eradicate them, which will improve the overall health and well-being of the population and eliminate the associated economic burden of morbidity and mortality.

Responsibilities of health care facilities with regard to infectious diseases are defined by current normative documents. Specifically, those responsibilities are the following:

1. Provide consultation (physical checkup) to every patient with an infectious disease presenting to the facility and cases occurring in the facility catchment area (according to the existing normative documents)

2. Refer all cases with communicable diseases requiring case confirmation for laboratory testing as specified in the existing guidelines

3. Administer proper treatment to any patient with a communicable disease

4. Refer patients to higher level facilities for appropriate diagnostics and treatment as needed

5. Register all cases of communicable diseases presenting themselves to private practitioners or occurring in facility targeted areas, as specified by current regulations

6. Notify the public health system of all cases of infectious diseases according to current regulations

7. Inform the community of the catchment area about the importance of prompt referral of infectious diseases cases, possible risks, and benefits of treatment. Information about entitlements of free consultation at the facility should be delivered as well

8. Prepare and submit monthly reports on infectious diseases according to current regulations

9. Support and facilitate any work carried out by a rayon/regional Center of Public Health (CPH) or National Center for Disease Control (NCDC) during case/outbreak investigation in a facility target area

10. Comply with any rules set by respective authorities in case of an infectious disease outbreak

2.2 Registration

All clinically diagnosed or laboratory-confirmed cases of communicable diseases that come to health facilities for treatment or consultation (irrespective of whether they are reported urgently or once a month) must be registered in a standard Infectious Disease Registration Journal number 60/A, which specifies the case-based information to be collected (see Figure 1). This record book is also used for registering cases of food, occupational, and other poisonings, radiological lesions, post-vaccination unusual reactions, and complications (see MoLHSA Decree 112/n 4 June, 2003).

Journal 60/A is kept at the facility and used for preparation of urgent notifications and reports and during outbreak investigations. Submitting an urgent notification does not relieve one from registering the information in journal 60/A.

Detailed instructions for the completion of journal 60/A are provided in Figure 1.

Journal 60/B (for CPH) (Figure 2) is kept at the rayon and regional levels and is used for preparation of reports and during outbreak investigations. Similar to journal 60/A, it is designed to record information on clinical (probable) or confirmed cases of communicable diseases and other conditions as described above. Upon receipt of an urgent notification (see Chapter 4), it is necessary for the CPH to transcribe key information into columns 1-11, 13-14, and 17-22 of journal 60/B. Other columns should be filled out during case/outbreak investigations. If a new case (including convalescent cases) is revealed during case/outbreak investigation, information about the case also should be recorded in journal 60/B.

Completed journals 60A and 60B should be kept at the facilities for five years.

Figure 1. Journal 60/A

N	Name	Age	Gender	Address	Place of study/ work	Disease onset date	Date of first presenta-tion/ hospitaliza-tion	Provisional diagnosis	Date of provisional diagnosis	Final diagnosis	Date of final diagnosis	Outcome	Physician who diagnosed the case	Notification sent to whom/ where/means of notification	Time /Date of notification	Name of a person who received notification	Comments
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

Instructions for the completion of Journal 60/A (for providers). All columns should be filled out clearly and correctly:

1. Case registration number, assigned chronologically
2. The first and the last name of a patient
3. Age (under 15 years of age, indicate date of birth: year, month, day)
4. Gender
5. Actual address of a patient, indicate permanent address as well if different from the current one
6. Occupation/study or other status (e.g., non-organized, unemployed, government and private employment, temporary or permanent job), indicate respective facility/institution – for the purpose of identifying possible contacts)
7. Date of onset of the disease. Indicate precise (if possible) date (day, month) that patient considers was the onset
8. Indicate date of the patient's first presentation in or hospitalization to your facility
9. Provisional (first) diagnosis
10. Date provisional diagnosis established
11. Final diagnosis laboratory test result
12. Date final diagnosis established
13. Outcome should be filled out after recovery/discharge of a patient or in fatal case of a disease. Indicate exact date (dd/mm/yy).
14. Indicate last name of the physician who diagnosed the case
15. Indicate address and the name of the institution notified about the case and the means of notification (urgent notification card, by phone, fax, etc.)
16. Indicate notification date and time. In case of sending an urgent notification card via courier, indicate date and time of its delivery.
17. Indicate the full name of a person who received notification.
18. Indicate additional information that may facilitate case investigation and management or if you consider important in the current situation.

Figure 2. Journal 60/B (for CPH)

N	Name	Age	Gender	Address	Place of study/ work	Disease onset date	Date of first presenta-tion	Facility that sent notification & means of notification	Provisional diag-nosis	Date provisional diagnosis established	Date specific treatment started	Date specimen taken	Result and date of lab. analysis	Vaccina-tion status	Date case investigation started	Final DS	Final Classi-fication	Date Final DS established	Outcome	Facility notified and means of notification	Notification date & time	Person that received notification	Case status	Comments
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

Instructions for the completion of Journal 60/B. All columns should be filled out clearly and correctly:

1. Case registration number (chronologically at CPH) or Epidemiological number (where appropriate)
2. The first and the last name of a patient
3. Age (under 15 years of age, indicate date of birth: year, month, day)
4. Gender
5. Actual address of a patient, indicate permanent address as well if different from the current one
6. Occupation/study or other status (e.g., non-organized, unemployed, government and private employment, temporary or permanent job), indicate respective facility/institution)
7. Date of onset of the disease. Indicate precise (if possible) date (day, month) that patient considers was the onset
8. Indicate the date of the first presentation of a patient to a medical facility/institution regardless of diagnosis made by and notification received from that facility/institution
9. Indicate facility/institution name that had sent notification and indicate the means of notification (urgent notification card, by phone, fax, etc). Indicate notification date and time. In case of sending an urgent notification card via courier, indicate date and time of its delivery
10. Clinical diagnosis (i.e. the first provisional diagnosis made by a health care provider as was subsequently notified upon)
11. Indicate date provisional diagnosis was established
12. Indicate date and time of specific treatment started (e.g., in cases of diphtheria, tetanus, and botulism, indicate date of serum administration, etc.)
13. Date specimen taken should be filled out if a specimen is taken for laboratory investigation. Indicate the type of specimen taken.
14. If specimen is taken for laboratory investigation, record date and time, results of laboratory analysis (indicating type of specimen and performed test) in this column.
15. This column should be filled out for VPDs only. Indicate vaccine doses received and date of their administration.
16. If an investigation is carried out by CPH (not the facility itself), the date should be filled out by the CPH officer.
17. Indicate final diagnosis.
18. Classify case [clinical (probable) or confirmed] in accordance with the standard case definitions.
19. Date final diagnosis was established.
20. Should be filled out after recovery/discharge of a patient or in case of fatal outcome of a disease. Indicate exact date (dd/mm/yy) for a given outcome.
21. Indicate the name and address of the facility (or facilities) that was further notified by CPH about the case and the means of notification (urgent notification card, phone, fax, or other) in accordance with the order of notified facilities (if two or more facilities are notified).
22. Indicate notification date and time. In case of sending an urgent notification card via courier, indicate date and time of its delivery.
23. Indicate full name of a person who received a notification.
24. Indicate patient's status in an outbreak: index (single, sporadic case), secondary case, or group/outbreak (two or more patients).
25. Indicate additional information that may facilitate case investigation and management or that you consider important in current situation.

3. Case Definitions/Case Confirmation and Classification

The usefulness of public health surveillance data depends on its uniformity, simplicity, and timeliness. State and local public health officials use the information about occurrence of diseases to accurately monitor trends, plan and make decisions, and evaluate effectiveness of interventions. The case definitions introduced in these guidelines establish uniform criteria for disease confirmation and classification to be applied by CPH and individual public and private facilities in Georgia for public health surveillance purposes.

3.1 General Principles

Upon receipt of immediate/urgent notifications, CPH staff (who are responsible for reporting of surveillance data) classify cases ***for epidemiological surveillance purposes*** into two categories: ***clinical (probable)*** and ***confirmed*** based on the latest available reports/notifications from health facilities and case-related laboratory and epidemiological data. Case confirmation criteria are outlined in the guidelines below.

Updates in case notifications and/or results of case/outbreak laboratory investigation allow CPH staff to update their classification of cases (recorded in column 18 of journal 60/B).

Clinical (probable) case is defined as any case for which clinical symptoms are compatible and resemble a notifiable disease.

Purpose: Clinical (probable) case definitions outlined in the guidelines below may help providers to determine whether what they are seeing is a case of a notifiable disease.

Action: When a physician suspects a case of a notifiable disease, he/she must notify the rayon CPH; this should lead to an investigation of a case/potential outbreak and initiation of appropriate public health action (specific actions are listed by disease in Table A, Notification, Reporting, and Investigation Requirements for Communicable Diseases [see Chapter 9 of these guidelines]).

Note: Initiation and specifics of treatment is *a purely clinical decision*, which is normally made once a provisional diagnosis is established. This decision does not have to depend on compatibility of a patient's symptoms with epidemiological surveillance definitions or case descriptions outlined in this manual.

Confirmed case is one that is confirmed by disease-specific laboratory tests and/or where an epidemiological link to other laboratory confirmed case(s) has been established.

For some diseases (e.g., tetanus), definition of a confirmed case is not applicable, because there is no laboratory test and no epidemiological link.

Purpose: Regional and national surveillance managers use disease confirmation rates to do the following:

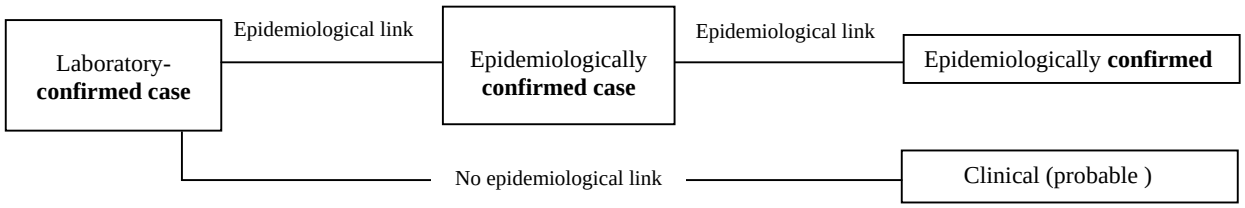
- Make public health interventions that have a long-term nature (e.g., policy changes, mass campaigns, development of disease elimination strategies, etc.)
- Assess the success of disease elimination efforts
- Assess the maturity of the surveillance system in various regions and in various settings
- Plan surveillance/laboratory system strengthening activities

Details on computation of disease confirmation rates are provided in Section 5.3, Recommended Methods of Analysis of these guidelines.

An epidemiological link is defined as an individual who has had close contact (specific for the transmission mechanism of a given disease) with a ***case*** during a period of incubation of the disease prior to the onset of symptoms (see Figure 3).

Epidemiologically confirmed is a case that has close contact (specific for the transmission mechanism of a given disease) with a ***laboratory confirmed case***.

Figure 3. Examples of Epidemiological Links



Both the number of all "***clinical (probable)***" and "***confirmed***" cases are reported through the surveillance reporting system from CPH to NCDC on a monthly basis, as described in Sections 4.2, Monthly Summary Notification and 4.3, Monthly Reporting.

Cases not compatible with the specified clinical descriptions of notifiable diseases and not confirmed either by specified lab tests or epidemiologically ***must not be reported through the surveillance channels from the rayon CPH upwards***. A case should be discarded for epidemiological surveillance purposes and medical statistics if:

a. an updated urgent notification about the change in the diagnosis (including the change from a notifiable communicable disease to a "somatic" disease, which also requires submission of an urgent notification) is received from a facility, or

b. during case/outbreak investigations, case records show that the case is not compatible with a clinical description of a notifiable disease and is not laboratory or epidmiologically confirmed

Table 2 illustrates how VPD cases are classified in the epidemiological surveillance system.

Table 2. Classification of VPD Cases in the Georgia Epidemiological Surveillance System

Disease	Clinical Description "Clinical (probable) case" criteria	"Confirmed Case" Criteria (at least one of the following)		Definition of the Epidemiological Link
		Laboratory confirmed	Epidemiologically confirmed	
Diphtheria	Any person with: ▲ laryngitis or pharyngitis or tonsillitis **and** ▲ an adherent membrane of the tonsils, pharynx and/or nose	A case that meets the clinical description with Isolation of toxin-producing Corynebacterium diphtheria or C.ulcerans from a clinical specimen Note: Non-respiratory/cutaneous diphtheria cases with isolation of toxigenic strains should be reported, as should asymptomatic carriers (any anatomical site) with toxigenic strains. Cases with non-toxigenic C.diphtheriae or C.ulcerans should not be reported.	A case that meets the clinical description and has epidemiological link to a laboratory-confirmed case.	Close contact (household, work/school setting, etc.) with another laboratory-confirmed case 2-7 days prior to the onset of symptoms
Measles	Any person with: ▲ fever, **and** ▲ maculopapular rash* (i.e., non-vesicular) **and** ▲ cough, running nose or conjunctivitis. * Measles rash usually begins on the face and neck and over the next 3 days gradually proceeds downward and outwards, reaching the hands and feet	A case that meets the clinical description with Presence of measles-specific IgM antibodies	A case that meets the clinical description and has an epidemiological link to a laboratory-confirmed case	Contact with another laboratory-confirmed case 7-18 days prior to the onset of symptoms
Mumps	Any person with: ▲ acute onset of unilateral or bilateral tender, self-limited swelling of the parotid or other salivary gland ▲ lasting >2 days and without other apparent cause	A case that meets the clinical description of mumps with ▪ Isolation of mumps virus from a clinical specimen **or** ▪ seroconversion or significant (at least fourfold) rise in serum mumps IgG titre* **or** ▪ mumps-specific IgM antibodies * * In the absence of mumps immunization in the preceding six weeks	A case that meets the clinical description of mumps and has an epidemiological link to a laboratory-confirmed case	Close contact (household, school, etc.) with another laboratory-confirmed case 11-26 days prior to the onset of symptoms
Rubella	Any person with: ▲ fever ▲ maculopapular rash **and** ▲ suboccipital, cervical or post-auricular lymphadenopathy **or** ▲ arthralgia/arthritis **Rubella cannot be confirmed clinically**	Presence of rubella-specific IgM antibodies	A case that meets the clinical description of rubella and has an epidemiological link to a laboratory-confirmed case	Contact with another laboratory-confirmed case 14-21 days prior to the onset of symptoms

Pertussis	A person with: a cough lasting at least two weeks **and**, at least one of the following: ▲ paroxysms of coughing **or** ▲ inspiratory "whooping" **or** ▲ vomiting immediately after cough without other apparent cause	A case that meets the clinical description of pertussis **and** *1.* Isolation of B. pertussis from a clinical specimen **or** 2. Positive polymerase chain (PCR) reaction assay for B. pertussis **or** 3. Positive paired serology	A case that meets the clinical description of pertussis and has an epidemiological link to a lab-confirmed case	Close contact (household, school, etc.) with another laboratory-confirmed case 2-15 days prior to the onset of symptoms
Tetanus	Any person with acute onset of hypertonia and/or painful muscular contractions (usually of the muscles of the jaw and neck) and generalized muscle spasms without other apparent cause	N/A	N/A	N/A
Neonatal tetanus	Any neonate with a normal ability to suck and cry during the first two days of life, **and** who between 3 and 28 days of age cannot suck normally, and becomes stiff or has clonic convulsions or both	N/A	N/A	N/A
Acute viral hepatitis	Any person with acute illness, typically including acute jaundice, dark urine, anorexia, malaise, fatigue, and right upper quadrant tenderness. Biological signs include increased urine urobilinogen and usually >2.5 times the upper limit of serum alanine aminotransferase (ALT) Note: a variable proportion of infections is asymptomatic	A case compatible with the clinical description with **Hepatitis A** IgM antibody to hepatitis A antigen (anti-HAV) positive **Hepatitis B** IgM antibody to hepatitis B core antigen (anti-HBc) positive For patients negative for hepatitis A or B, further testing for a diagnosis of acute hepatitis C, D or E is recommended. **Hepatitis C** 1. Antibody to hepatitis C antigen (anti-HCV) positive **Hepatitis D** (only as co-infection or super-infection of hepatitis B) 1. Anti-HDV positive and HBsAg positive 2. Anti-HDV positive and IgM anti-HBc positive **Hepatitis E** 1. IgM antibody to hepatitis E antigen (IgM anti-HEV) positive	**Hepatitis A** A case compatible with the clinical description in a person who has an epidemiological link to a lab-confirmed hepatitis A case.	For Hepatitis A only: Close contact (household, sexual, etc.) with a case (which later will be lab-confirmed) during period of communicability, 15-50 days prior to the onset of symptoms.
Congenital rubella syndrome	An illness manifesting in infancy, resulting from rubella infection *in utero* and characterized by two of the manifestations specified in group A, or one from group A and one or more from group B: A) Cataracts/congenital glaucoma, congenital heart disease, hearing impairment, pigmentary retinopathy B) Purpura, splenomegaly, microcephaly, mental retardation, meningoencephalitis, radiolucent bone disease, or jaundice with onset within 24 hours after birth	A clinically consistent case that has rubella- specific immunoglobulin M (IgM) antibody.	N/A	N/A

Congenital rubella infection	A case without clinical manifestations that has a history of rubella exposure during mother's pregnancy	A case with no clinical manifestations in which rubella-specific IgM antibody was detected	N/A	N/A
Poliomyelitis	Any child under 15 years of age with acute (rapidly developed within 1-4 days) flaccid paralysis (AFP) or any person at any age with paralysis illness suspected for polio	AFP case, in whom poliovirus has been isolated from feces	N/A	N/A
Febrile rash illness	Any person with fever and maculopapular rash Note: such cases require syndromic supervision, which will be initiated during stage III of measles control	Group cases of febrile rash ilnesses require laboratory testing to identify or exclude measles and or rubella	N/A	N/A
Rabies	An acute encephalitis dominated by forms of hyperactivity or paralytic syndromes that progresses towards coma and death (usually by respiratory failure) within 7 to 10 days after the first symptom if no intensive care is instituted. Bites or scratches from a suspected animal can usually be tracked back in the patient's medical history. The incubation period may vary from days to years but usually falls between 30 and 90 days.	A clinical case with *In humans:* ▲ Detection of rabies viral antigens by direct fluorescent antibody (FA) in clinical specimens, preferably brain tissue (collected post mortem) ▲ Isolation of rabies virus from clinical specimens collected ante mortem (e.g., skin or cornea smear) and confirmation of rabies viral antigens by direct FA test ▲ Detectable rabies-neutralizing antibody titer in the CSF (cerebral spinal fluid) of an unvaccinated person ▲ Identification of viral antigens by PCR on fixed tissue collected post mortem or in a clinical specimen (brain tissue, skin, cornea, saliva). ▲ Bio-test: Mice inoculation with infected brain extract and one-month follow-up *In animals:* ▲ Detection of rabies viral antigens by direct FA method in brain tissue. ▲ Bio-test: Mice inoculation with infected brain extract and one-month follow-up	N/A	N/A
Shigelosis	Frequent (three or more times per day) and painful passage of stools that has visual presence of blood, mucus or pus, accompanied by fever and stomach cramps.	A case that meets the clinical description of shigellosis that is laboratory confirmed (isolation of *Shigella* from a stool specimen)	A case that meets the clinical description of shigellosis and that was exposed to the same source of infection as a laboratory confirmed case	

Salmonelosis	Any person with diarrhea, fever > 37^0C, abdominal pain, nausea, and sometimes vomiting.	A case that meets the clinical description of salmonellosis that is laboratory confirmed (isolation of *Salmonella* from a clinical specimen)	A case that meets the clinical description of salmonellosis and that was exposed to the same source of infection as a laboratory confirmed case	
Cholera	Severe dehydration or death from acute watery diarrhea in a patient aged 5 years or more.	A case that meets the clinical description of cholera and that is laboratory confirmed (isolation of *Vibrio cholerae O1 or O139* from stools in any patient with diarrhea)		
Bacterial Meningitis	Any person presenting with fever >38.0^0C, and one or more of the following ✓ neck stiffness ✓ severe unexplained headache ✓ altered consciousness ✓ other meningeal signs ✓ neck pain and 2 or more of the following • photophobia • nausea • vomiting • abdominal pain • pharyngitis with exudates	A case consistent with the clinical description above and identification of a bacterial pathogen (i.e., *Hib, pneumococcus or meningococcus)* in the CSF or blood by culture, antigen detection methods or Gram stain.		

4. Notification and Reporting

All notifiable diseases and conditions are divided into two groups according to their implication to public health surveillance and response:

- Diseases and conditions of which health authorities must be notified urgently
- Diseases and conditions of which health authorities must be notified monthly

All reportable diseases and conditions are divided into two groups as well:

- Cases of infectious diseases and conditions subject to monthly reporting
- Cases of infectious diseases and conditions subject to annual reporting

Note: Groups of notifiable and reportable diseases do not match.

All institutions and providers rendering health care services to the population regardless of their subordination and forms of ownership, including laboratories and private care providers, must notify the local public health service whenever they diagnose, suspect, or even receive positive laboratory results for any of the diseases or conditions listed below. The NCDC determines and annually updates the list of notifiable and reportable diseases on the basis of the current epidemiological situation.

4.1 Urgent Notification

"Urgent notification" refers to urgent (during the same business day, but under no circumstances more than 24 hours from first identification) submission of information about clinical (probable) or laboratory-revealed cases to the next highest level of the public heath service. In such cases, the provider must notify the rayon CPH about such cases within that timeframe using any available means of communication (notification card, phone, fax, e-mail). The rayon CPH in turn must submit the appropriate information to the central (NCDC, MoLHSA) and regional (regional CPH) institutions.

Notification of every single case of the diseases and conditions shown in Table 3 has to be sent through the public health system.

For the following internationally regulated, especially dangerous diseases, information should be submitted **immediately (without any delay):**

1. Plague
2. Cholera
3. Yellow fever
4. Poliomyelitis
5. Viral hemorrhagic fever
   5.1. CCHF (Crimean-Congo Hemorrhagic Fever)

5.2. Hemorrhagic fever with renal syndrome

5.3. Unspecified viral hemorrhagic fever

6. Tularemia
7. Anthrax
8. Rabies
9. Severe acute respiratory syndrome (SARS)
10. Viral Influenza caused by a new subtype
11. Smallpox
12. Tickborne encephalitis A84.0; 84.1; 84.8; 84.9.

A WHO decision instrument for the assessment and notification of events that may constitute a public health emergency of international concern is in Annex A.

Table 3. List of Urgently Notifiable Diseases and Flow of Notifications through the Public Health System

	Name	ICD-10 Code	Notification should be sent to the rayon CPH		Notification should be sent from the rayon CPH to the regional CPH and NCDC
			By health care providers	By laboratories	
1.	Diphtheria	A36	X	X	X
2.	Pertussis	A37	X	X	X
3.	Neonatal tetanus	A33	X		X
4.	Tetanus	A34 -35	X		X
5.	AFP / Acute poliomyelitis	A80	X	X	X
6.	Measles	B05	X	X	X
7.	Rubella	B06	X	X	
8.	Congenital rubella syndrome	P.35.0	X		X
9.	Mumps	B26	X	X	
10.	Acute viral hepatitis A	B15	X	X	
11.	Acute viral hepatitis B	B16	X	X	
12.	Acute viral hepatitis C	B17.1	X	X	
13.	Acute viral hepatitis E	B17.2	X	X	
14.	Cholera	A00	X	X	X
15.	Typhoid fever	A01	X	X	
16.	Paratyphoid fevers A, B, C;	A01.1-4	X	X	
17.	Other salmonella infections	A02	X	X	
18.	Shigellosis	A03	X	X	
19.	Other bacterial intestinal infections	A04	X	X	
20.	among them: Esherichiosis	A04.4	X	X	
21.	Yersiniosis	A04.6	X	X	
22.	Food-borne bacterial intoxications	A05	X	X*	
23.	among them Botulism	A05.1	X	X	X
24.	Unspecified infectious diarrheal	A09	X		

			Notification should be sent to the rayon CPH		
	diseases				
25.	Plague	A20	X	X	X
26.	Tularemia	A21	X	X	X
27.	Anthrax	A22	X	X	X
28.	Brucellosis	A23	X	X	X
29.	Leptospirosis	A27	X	X	X
30.	Listeriosis	A32	X	X	X
31.	Meningococcemia	A39.2	X	X	X
32.	Meningitis		X	X	
33.	of them N. meningitids	A39.0	X	X	
34.	Haemophilus Influenza B	G00.0	X	X	x
35.	S.pneumoniae	G00.1	X	X	x
36.	M. tuberculosis	A17.0	X	X	x
37.	other bacterial meningitis		X	X	
38.	Relapsing fever	A68	X	X	X
39.	Lyme disease (Borelliosis)	A69.2	X	X	X
40.	Flea-borne typhus	A75	X	X	X
41.	Q fever	A78	X	X	X
42.	Rabies	A82	X	X	X
43.	Unconfirmed viral infections of CNS	A89	X		X
44.	Arthropods transmitted viral fevers and viral hemorrhagic fevers	A90-A99	X	X	X
45.	Yellow fever	A95	X	X	X
46.	Malaria	B50-54	X	X	
47.	Trichinosis	B75	X	X	
48.	Hospitalized cases of influenza-like illness	J- 06.9; 22; 10; 10.1; 11; 11.1; 12; 12.1; 12.2; 12.8; 18.	X		
49.	Fever of unknown etiology (t>38 and lasts more than 5 days)	R - 50.0; 50.1; 50.9.	X		X
50.	Radiological lesions	W88; 91	X	X	X
51.	Acute occupational poisonings	Z 57.4 -57.5	X	X	
52.	Post-vaccination, unusual reactions and complications	Y58–59; 64.1	X		X
53.	Intrahospital Infecitons	Y95	X	X	
54.	Isolations of vancomycin resistant staphylococcus		X	X	X
55.	Severe acute respiratory syndrome		X		X
56.	Fatal cases of acute infectious diseases		X		X
57.	Contact with animals (risk of rabies)		X		
58.	Group cases of infectious diseases		X		X

* Indicating all identified pathogens

Urgent notification must be done of group cases of any infectious diseases (excluding acute respiratory infections (ARI) and influenza). Group cases imply three or more cases that occur in one or more facilities in one incubation period and that are epidemiologically linked or caused by one agent. In this case one urgent notification card should be filled out with an indication that this is a group case. A list of cases including the patients' names, ages, and addresses should be prepared and sent to the rayon CPH along with the card. This information also could be delivered by any other means of communication (e.g., phone, fax, e-mail).

During outbreaks of a large number of cases, it is permissible to notify the CPH via telephone providing brief information only (the diagnose, number of cases, age groups of cases, and support required). Names of the patients do not have to be specified in such cases.

Note: Rayon CPH should immediately notify the State Sanitary Inspection, in addition to the regional CPH, for any cases of food and acute workplace-related intoxications, radiation lesions, as well as group cases of any communicable disease.

Veterinary services should be notified urgently upon identification of zoonotic infections (e.g., anthrax, brucellosis, and other) in humans.

4.1.1 Urgent Notification Card

The ***Urgent Notification Card*** in the standard format is to be used at all levels of the public health system and can be completed by a health practitioner who has suspected or detected a clinical (probable) or confirmed case of any disease listed in Table 3, or by CPH personnel who need to send the information further up the public health surveillance system. See Figure 4 for a sample card.

Figure 4. Urgent Notification Card

<table>
<tr><td colspan="2">Confidential</td><td colspan="4">Urgent Notification Card #58/1</td></tr>
<tr><td colspan="4">1. The notification sent to _____(facility)
Case diagnosed by _____(name, position)
Notification sent by _____(name, position, facility) Signature _____</td><td>Date</td><td>Time</td></tr>
<tr><td colspan="4">2. Registration number (in Journal 60)
= = = = = = = = = = >> >></td><td colspan="2">Registration # in 60a or 60b (underline)</td></tr>
<tr><td colspan="2">3. Last (family) name</td><td colspan="2">First name</td><td colspan="2">Middle name</td></tr>
<tr><td colspan="3">4. Sex: Male ____ Female _____</td><td colspan="3">5. Age (for children under 15 please indicate the date of birth)</td></tr>
<tr><td colspan="2">6. Address</td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td colspan="3">Town/village</td><td>Rayon</td><td colspan="2">Street, house, apt #</td></tr>
<tr><td colspan="3">7. Name and address of workplace or children's facility</td><td colspan="3"></td></tr>
<tr><td colspan="6">8. Diagnosis</td></tr>
<tr><td>9. DATES ==>>></td><td>Disease onset:</td><td colspan="2">First visit to health facility:</td><td colspan="2"></td></tr>
<tr><td colspan="2">10. Current location of the patient</td><td colspan="4">a) At a hospital _____(indicate which one)
b) At home _____(indicate actual address)
c) Other_____</td></tr>
<tr><td colspan="6">11. Additional information (e.g., potential source of infection, group case)</td></tr>
</table>

Data used to fill urgent notifications come from case histories and journal 60/A. Urgent notifications can be made by phone. In such cases, there is no need to send the card; however, the information should be passed on strictly in accordance with the urgent notification card format to be recorded on an urgent notification card at the receiving end.

In large facilities, many providers may diagnose infectious disease cases. All providers are required to complete urgent notification cards promptly for cases they see. In such large facilities it is recommended that one person (e.g., nurse) be assigned the responsibility of sending notifications to the CPH. This person would collect notification cards from providers and send all of them together.

As additional surveillance information becomes available, a patient's diagnosis may change. In this case, providers or laboratories must submit another urgent notification card with the updated diagnosis indicating ***"changed"*** (regardless of whether the changed diagnosis is urgently notifiable or not, e.g., somatic diseases) to the appropriate CPH, which, in turn, passes it to the NCDC. Group status for all notifiable diseases should be indicated in line #11 of the card for additional information.

If a rayon CPH receives notification about a case that was contracted in another territory (other rayon or city), or a case that visited another rayon or city during the incubation period, information about such a case should be sent to the respective rayon CPH (during the same business day, but under no circumstances later than 24 hours from identification) in order to enable it to implement response actions and report about the case. Information can be sent by any means of communication (telephone, fax, e-mail). At the receiving end, information is recorded in journal 60/B, notified to upper level (if required), and reported monthly/annually.

4.1.2 Laboratory Confirmation of a Communicable Disease Result/Notification Form

The ***Laboratory Confirmation of a Communicable Disease Result/Notification Form*** in the standard format is to be used by a) laboratories regardless of their subordination and ownership and b) by CPH personnel who need to send the information further up the public health surveillance system

Laboratories detecting or confirming a case of a notifiable disease from the list in Table 3 must follow the same requirements: urgently notify (during the same business day, but under no circumstances more than 24 hours from identification) the local CPH by any available means of communication.

A person responsible for the test result should send notifications using the standard Laboratory Confirmation of a Communicable Disease Result/Notification Form (see Figure 5). If notification is made by phone, the same format should be used (to be recorded in journal 60/B at the receiving end). In case of a negative result of a test, there is no need to send notification to the CPH. In such a case, a response should be sent on the same form to the physician requesting the test. Submission of only one notification to the CPH is required even if more than one specimen of a similar type may be taken from the patient during an episode of illness. Confidentiality of all laboratory notifications is regulated by the Law on Health Care.

Figure 5. Laboratory Confirmation of a Communicable Disease Result/Notification Form

Confidential	**Laboratory Result/Notification of a Communicable Disease Form #58/2**
Case: Last Name I First Name I Middle Name I Age I Sex I Address [Apt #; Street; City (village); Country] I Tel: I Date specimen was taken -------/ -------/------ [dd / mm / yy]	
Referred by ○ Self-referral ○ Physician ○ Health facility/CPH ○ Laboratory ○ Other_____	Contact information of the referring physician or institution: Name_____ Address_____ Telephone_____ Fax_____ E-mail_____
Result (outcome) (indicate if pathogen is isolated) _____	

Type of specimen	Smear/lavash/scrape/swab/biopt	Type of test performed	○ Serology (specify)
○ Blood/Serum	○ Pharyngeal	Culture	_____
○ CSF	○ Naso-pharyngeal	○ Bacteriology	○ Microscopy
○ Stool	○ Vaginal	○ Virology	○ Histology
○ Urine	○ Oral	○ Parasitology	○ Molecular identification
○ Sputum	○ Skin		
Other_____	○ Eye		

Date and time of result:	Date and time of CPH notification:	Name and address of laboratory	Name and signature of the person responsible for the result:

Notification sent by [name and signature] :		Notification recipient: [name and position]

Chiefs and managers of private sector facilities and laboratories involved in diagnosis and treatment of infectious diseases are responsible for ensuring that their staff are aware of and comply with the case notification requirements.

4.2 Monthly Summary Notification

On the basis of case-based information contained in record book 60, each month **health facilities** submit one notification to the rayon CPH by the first day of the next month about several diseases and conditions, as shown in Figure 6. (Note that health facilities are not required to notify on a monthly basis about those diseases subject to urgent notification.)

If a facility (rayon) does not see a single case of a particular disease during a given reporting period, it must indicate “0” in the respective rows of the “TOTAL” column of the report (rather than leaving blank spaces) to avoid confusion between “no cases” and “incomplete reporting of cases.”

Figure 6. Monthly Summary Notification Form

Monthly Summary Notification Form #58/3

Facility_____ Month_____ Year_____

Responsible person for completing the form_____

Disease/Age	ICD-10 Code	<1	1-4	5-14	15-19	20-29	30-59	60 and more	TOTAL	No. LAB TESTED	among them No. LAB CONFIRMED
Acute respiratory infections	J00-J06										
Influenza	J10-J11										
Amebiasis	A06										
Scarlet fever	A38										
Varicella	B01										
Other viral hepatitis	B17.0 17.8										
Chronic viral hepatitis B	B18.0-18.1										
Chronic viral hepatitis C	B18.2										
Cytomegalovirus infection	B25										
Infectious mononucleosis	B27										
Leishmaniosis	B55										
Echinococcosis	B67										
Ascariasis	B77										
Trichocephalosis	B79										
Enterobiasis	B80										
Snake bites	X20										
Toxic insects bites	X21-25										

4.3 HIV/AIDS and Tuberculosis Notification

HIV/AIDS Infection Notification Rules

Facilities that confirm HIV/AIDS infection should notify CPH of the rayon in which the patient is resident about the case within 72 hours. Figure 7 shows an HIV/AIDS Urgent Notification Card.

Figure 7. HIV/AIDS Urgent Notification Card

<table>
<tr><td>Confidential</td><td colspan="8">HIV/AIDS Special Urgent Notification Card – #58/4</td></tr>
<tr><td colspan="2">Notification sent to

_____
(rayon, facility)</td><td colspan="7">registration # in 60/A</td></tr>
<tr><td colspan="2" rowspan="4">Notification sent by

_____
(name, position, facility)

_____
(Signature)
contact address, tel., fax, e-mail

_____</td><td colspan="7">Information about the patient:</td></tr>
<tr><td>sex:
(mark with X)</td><td colspan="2">female</td><td colspan="2">male</td><td colspan="2">unknown</td></tr>
<tr><td colspan="7">age group (mark with X)</td></tr>
<tr><td>0-1</td><td>1-4</td><td>5-14</td><td>15-19</td><td>20-29</td><td>30-59</td><td>60+</td><td>unknown</td></tr>
<tr><td colspan="9">Diagnosis: Date of diagnosis: dd/mm/yy</td></tr>
</table>

A separate card is completed for each confirmed case and sent **according to the general rule of infectious disease case notification:** by any available means of communication (notification card, phone, fax, e-mail). If notification is made by phone, there is no need to send the card.

CPH personnel at the receiving end should register the case and use the information for analytical purposes. They are not authorized to request additional information from the facility that submitted the notification.

Regional/rayon CPH should perform HIV/AIDS case investigation in accordance with the current regulations in case such investigation is requested by a special task order issued by the Central Program.

Tuberculosis Infection Notification Rules

TB cases are subject to routine summary notification, which is prepared by specialized facilities and sent to rayon CPH quarterly. CPHs that receive such notifications should register and use aggregated data for situation analysis. Figure 8 shows a Tuberculosis Summary Notification Card.

Figure 8. Tuberculosis Summary Notification Card- #58/5

Notification sent to :

rayon (town) _____ facility _____

Notification sent by

_____ facility _____
(name, position)

date _____

1. Pulmonary tuberculosis

	New Cases								TOTAL registered cases								TOTAL	
	0-4	5-14	15-24	25-34	35-44	45-54	55-64	65+	0-4	5-14	15-24	25-34	35-44	45-54	55-64	65+	Female	Male
Smear positive (+)																		
Smear negative (-)																		
Without bacterioscopy																		

2. Extra-pulmonary tuberculosis

	TB meningitis	Bone TB	Urogenital TB	TB pleuritis	Lymph node TB	Other TB	Military TB	TOTAL	
								Male	Male
New cases									
Total registered									

Note: The form is to be filled by I, II, III level TB facilities (polyclinics, cabinets, dispensaries) and send to rayon CPH quarterly according to the place of residence of patients.

Signature _____

4.4 Monthly Reporting

4.4.1 Monthly Reporting by Rayon CPH

The monthly report contains information about a number of urgently notifiable diseases (which CPH epidemiologists can get from journal 60/B and investigation reports) as well as about influenza, ARI, and amebiasis. Data have to be aggregated from the monthly notifications submitted by health facilities, and workbooks for data aggregation are provided.

Rayon CPHs submit two copies of the monthly reports to the regional CPH not later than on the fifth day of the following month, according to the Infectious and Parasitic Diseases Form found in Figure 9.

Figure 9. Infectious and Parasitic Disease Monthly Reporting Form

Infectious and Parasitic Diseases
Monthly Reporting Form #IV-03/1

Disease/age group	ICD-X Code	<1	1-4	5-14	15-19	20-29	30-59	60 and more	TOTAL	No. LAB TESTED	No. LAB CONFIRMED	TOTAL CONFIRMED (lab. or epid. Link)
1	2	3	4	5	6	7	8	9	10	11	12	13
Diphtheria	A36											
Pertussis	A37											
Measles	B05											
Rubella	B06											
Mumps	B26											
Acute Viral Hepatistis A	B15											
Acute Viral Hepatitis B	B16											
Acute Viral Hepatitis C	B17.1											
Acute Viral Hepatitis E	B17.2											
Typhoid fever	A01											
Paratyphoid A, B, C fever	A01.1-4											
Other salmonellosis	A02											
Shigellosis	A03											
Other Intestinal bacterial Infections	A04											
of them Escherichiosis	A04.4											
Yersiniosis	A04.6											
Foodborne Bacrterial Intoxications	A05											
of them Botulism	A05.1											
Amebiasis	A06											
Unspecified infectious diarrheal diseases	A09											
Brucellosis	A23											
Meningococcaemia	A39.2											
Meningitis total												
of them N. meningitids	A39.0											
Haemophilus Influenza B	G00.0											
S.pneumoniae	G00.1											
M tuberculosis	A17.0											
other bacterial menigitis												
Malaria	B50-54											
Leishmaniasis	B55											
Acute Respiratory Infections	J00-J06											
Influenza	J10-J11											
Hospitalized cases of Influanza-like illness	J- 06.3; 22; 10; 10.1; 11; 11.1; 12; 12.1; 12.2; 12.8;											
Fatal cases of infectious diseases										Specify disease(s):		

If there is no single case of any notifiable diseases during a given reporting period, facilities are required to indicate "0" in the respective line of the "Total" column of the reporting form (instead of leaving a blank space) in order to avoid confusion between "no cases" and "incomplete reporting of cases." Group of diseases such as "other bacterial infections" (A04) includes a number of diseases. If during a reporting period other cases (apart from esherichiosis and yersiniosis) occurred outside of the total group number, these cases should be recorded separately.

Monthly statistical reports to the NCDC should include cases for which final classification is pending. Diagnoses could still change as additional laboratory and epidemiological data become available. Monthly reports should be updated after the final classification.

Along with the monthly report form, rayon CPHs should submit to the regional CPH ***two copies*** of standard case/outbreak investigation reports about cases of selected urgently notifiable diseases (see VPD-specific sections) and ***two copies*** of anti-rabies activity reports in accordance with the established form CD-4. Copies of all reporting forms and investigation reports submitted should remain at the facility (see Tables A and B in Chapter 9). The format of case and outbreak investigation reports and other aspects of the investigation are discussed in subsequent chapters of these guidelines.

4.4.2 Monthly Reporting by Regional CPHs

Regional CPHs forward one of the two copies of the monthly reports received from the rayon CPH to the NCDC. They also enter the information from these reports into an electronic database and should submit an aggregated regional summary report (in the same format) to the NCDC by the seventh day of the following month.

4.5 Annual Reporting

Health facilities are not required to submit annual reports. Rayon and regional CPHs provide annual reports using the form in Figure 10. They should follow the same procedures outlined in the monthly reporting section (i.e., aggregate data from the monthly reports submitted by health facilities and monthly reports prepared at CPH; workbooks for data aggregation are provided).

Instructions for completing summary notification (58/3) and monthly/annual reporting forms are the following:

- Columns 3-9 – indicate the number of cases in the reporting month/year broken down by age groups.
- Column 10 – indicates the total number of cases that should equal the sum of numbers in columns 3-9.
- Column 11 – indicates the number of laboratory-tested cases.
- Column 12 – indicates the number of laboratory-confirmed cases.
- Column 13 – monthly/annual reporting form indicates the total number of cases that are classified as "confirmed cases" (laboratory or epidemiological link) according to the standard case definitions.

Figure 10. CPH Annual Report Form

Annually reportable Infectious and Parasitic Diseases
Reporting Form *#IV-03*

Disease/age group	ICD-X Code	<1	1-4	5-14	15-19	20-29	30-59	60 and more	TOTAL	No. LAB TESTED	No. LAB CONFIRMED	TOTAL CONFIRMED (Lab. or epid. Link)
1	2	3	4	5	6	7	8	9	10	11	12	13
AFP/Acute poliomyelitis	A80											
Congenital Rubella Syndrom	P.35.0											
Neonatal Tetanus	A33											
Tetanus	A34-35											
Cholera	A00											
Plague	A20											
Tularemia	A21											
Anthrax	A22											
Leptospirosis	A27											
Listeriosis	A32											
Scarlet fever	A38											
Relapsing fever	A68											
Flea- borne typhus	A75											
Lyme disease	A69.2											
Q fever	A78											
Rabies	A82											
Unconfirmed Viral infections of CNS	A89											
Arthropods transmitted viral fevers and viral hemorrhagic fevers	A90- A99											
Yeallow fever	A95											
Varicella	B01											
Other viral hepatitis	B17											
Chronic viral hepatitis B	B18.0-18.1											
Chronic viral hepatitis C	B18.2											
Cytomegalovirus infection	B25											
Infectious mononucleosis	B27											
Echinococcosis	B67											
Trichinosis	B75											
Ascariasis	B77											
Trichocephalosis	B79											
Enterobiasis	B80											
Intrahospital infections	Y95											
SARS												

5. Data Analysis

Prompt analysis of the collected data provides information for the following:

- Identifying causes of problems and their most appropriate solutions
- Identifying trends and taking prompt public health action
- Evaluating the quality of disease prevention and control activities/programs over the medium and long term.

The differences in the scope and depth of the data analysis are determined by the level of the public health system where the analysis is performed, and whether the analysis is routine (monthly, yearly) or urgent (e.g., during outbreaks). In order for the analysis to be meaningful, complete, and accurate, VPD surveillance data need to be available. Data are typically analyzed ***by time*** (e .g., a monthly trend), ***place*** (e.g., by subordinated rayons or facilities), and ***demographic and biological factors*** (e.g., by age group, immunization status, gender).

5.1 Urgent Analysis

Urgent analysis (during an outbreak investigation) should be performed by a rayon CPH

- to identify causes of fatalities (if any) of any notifiable disease
- in case of outbreaks of notifiable diseases

Urgent analysis includes summarizing cases by the day or week of onset, determining locations at risk (using maps, tables, or histograms), and breaking down cases and deaths by age group, gender, immunization status, place of work, school attendance, and other known risk factors to determine who is at greatest risk of contracting the disease and what prevention or control measures are most appropriate. Urgent analysis is prepared in written form. It should be kept for five years and submitted to upper levels of the public health system according to existing regulations and requirements.

The recommended types of urgent analysis are presented in Table 4.

Table 4. Recommended Types of Urgent Analysis

Recommended type of urgent analysis of surveillance data	Purpose	Timeframe	Facility	Rayon/ Regional CPH
Reasons behind each fatality (if any)	To identify exactly what has failed in the disease prevention and control program	As soon as possible (up to 12-72 hrs)	X	X
Summarizing cases by time (day or week of onset)	To confirm the occurrence of more cases in a place and time than expected, which defines an outbreak To estimate incubation period	Upon receiving urgent case notifications and during outbreak investigation		X
Case/death breakdown or mapping by place	To try to identify vehicle(s) of infection To verify diagnosis To determine high-risk areas or locations of populations at risk			X
Case/death breakdown by age group, gender, immunization status, place of work, school attendance	To determine who is at greatest risk of a given disease and potential risk factors			X

5.2 Routine Analysis

Routine analysis is performed at all levels of the public health system. It is typically based on the data from monthly/annual reports 58/1, 58/2, 58/3, investigation forms, etc. Recommended routine types of analysis for each of the levels are presented in Table 5.

Table 5. Recommended Types of Routine Analysis

Recommended type of routine analysis of surveillance data	Purpose	Timeframe		
		Facility	Rayon CPH	Regional CPH
Timeliness of reporting	Identify facilities that prevent timely analysis		Monthly	Monthly
Completeness/accuracy of reporting	Identify source of poor-quality data		Monthly	Monthly
Case/death breakdown by place	Determine high risk areas or locations of populations at risk		Quarterly Annually	Quarterly Annually
Case/death breakdown by age group and immunization status	Determine who is at greatest risk of a given disease and potential risk factors		Quarterly Annually	Quarterly Annually
Incidence per 100,000, age/sex/ immunization, status/occupation and other factor-specific incidence rates	Determine who is at greatest risk and identify major risk factors for a given disease		Quarterly Annually	Quarterly Annually
Proportion of cases lab-tested, case confirmation rates	Assess functioning of lab. service, maturity of the surveillance system, and success of disease elimination		Quarterly Annually	Quarterly Annually
Case/Outbreak investigation rate	Monitor CPH adherence to the outbreak investigation requirements and highlight possible barriers		Quarterly Annually	Quarterly Annually
Case-fatality rates. Reasons behind each of the deaths (if any).	Identify exactly what has failed in the disease prevention and control program	Annually		Quarterly Annually
Morbidity by time (trends)	Determine abrupt or long-term changes in disease occurrence	Annually *(for facilities serving>5000 people)*	Quarterly Annually	Quarterly Annually
Vaccination efficacy	Low vaccine efficacy require investigation of possible reasons			Annually

Routine analysis is prepared in written form. It should be kept for five years and submitted to upper levels of the public health system according to existing regulations and requirements.

During routine comparative analysis, a given parameter should be compared to the same parameter for the previous timeframe (e.g. quarter to quarter, year to year, etc.)

Diseases targeted for elimination (for example, poliomyelitis) may require routine analysis of additional information as specified by the World Health Organization (WHO). As a rule, this type of analysis is based on investigations of each reported case (according to the order of MoLHSA #230/0, 02.07.1997) and is usually performed by national experts at the NCDC.

5.3 Recommended Methods of Analysis

5.3.1 Reasons for Deaths

Knowing the reason why a patient with an infectious disease has died will help facilities choose an appropriate public health response or action to prevent more fatalities in the future. Analysis of reasons behind deaths involves reviewing case information (case histories, notifications, records in journal 60/A) and exploring the possible causes as presented in Table 6.

Table 6. Causes of Infectious Disease Fatalities and Possible Public Health Actions

Reasons	Possible public health action:
1. Patient sought health care too late	Intensify community health education Discourage self-treatment
2. Case identified timely, but treatment was not provided	Enforce adherence to case management standards Combat treatment through “unofficial” channels
3. Case identified in a timely manner, but treatment was delayed (drugs not available and have not been delivered in timely manner from other places)	Improve drug delivery channels Educate other practitioners about how bad communication and cooperation resulted in a patient’s death
4. Inappropriate treatment given (misdiagnosis, other reasons)	Enhance provider education
5. Drug resistance developed	Modify case management protocols
6. Immunization failure	Calculate vaccine efficacy Evaluate vaccine storage and administration in this area

5.3.2 Case Fatality Rates

The case fatality rate (CFR) is the proportion of persons with a particular condition who die from that condition. The CFR is a measure of severity of illness, which also can reflect the appropriateness of case detection and case management practices, as shown in the following equation:

$$\textit{Case fatality rate} = \frac{\textit{No. of deaths among incident cases}}{\textit{No. of incident cases}} \times 100\%$$

Currently there are very few infectious disease-related deaths in Georgia, due to improved disease control; therefore, it makes sense to determine and monitor this rate only at the regional and national levels. *Health managers observing a high CFR for a given disease (as communicated by NCDC) need to urgently take measures to improve accessibility of care, timeliness of treatment, and adherence to proper case management protocols/guidelines.*

5.3.3 Morbidity Trends

Regular monitoring of priority infectious diseases morbidity is recommended for every health facility involved in the surveillance program that serves 5,000 or more people, along with all CPHs.

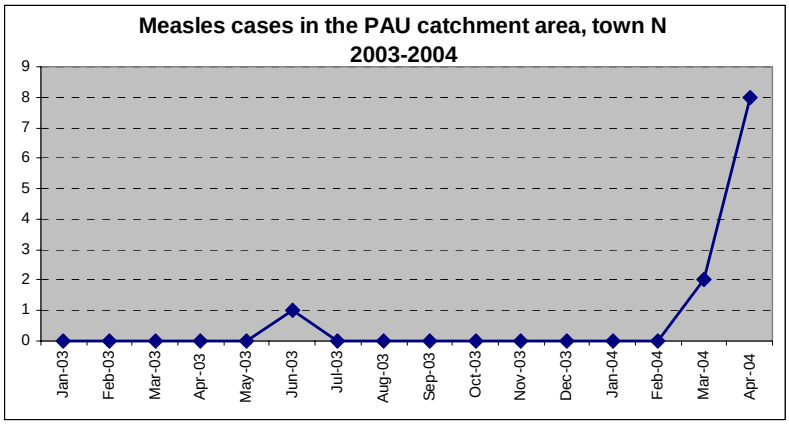
A CPH epidemiologist, a physician who is most directly involved in the detection and treatment of infectious diseases, or a statistician may monitor morbidity trends. The data should be regularly reviewed by the facility chief doctor/manager and shared in this or other forms with the health administration of a given area and other stakeholders who are interested or in need this information.

Recommended morbidity monitoring tables for VPDs are contained in the *Workbook for Rayon Centers on Surveillance and Control of Vaccine-Preventable Diseases in Georgia*[1] and examples are provided in Figure 11. However, health workers are encouraged to use any other alternative, for example, to plot them in a chart, if it helps to present or highlight a problem to those who need to know.

Figure 11. Examples of Morbidity Monitoring Tables and Graph

Cases of Priority Infectious Diseases, 2004, Town N

	J	F	M	A	M	J	J	A	S	O	N	D	Total
Diphtheria	0	1	0	0									1
AFP	0	0	0	0									0
Measles	0	0	2	8									10
													.



Absolute numbers can be used for trends monitoring during quarterly analysis if target population of health care facilities and rayon CPH catchment areas of do not change significantly. In other cases trend monitoring should be based on incidence rates.

Case investigations and classification by CPH staff will help ensure that no other cases are missed, non-confirmed cases are filtered out, and only those cases that meet the standard case definition are reported to the next level.

[1] Ministry of Labor, Health and Social Affairs, National Center for Disease Control. October 2004. *Workbook for Rayon Centers on Surveillance and Control of Vaccine Preventable Diseases in Georgia*. Bethesda, MD: The Partners for Health Reform*plus* Project, Abt Associates Inc.

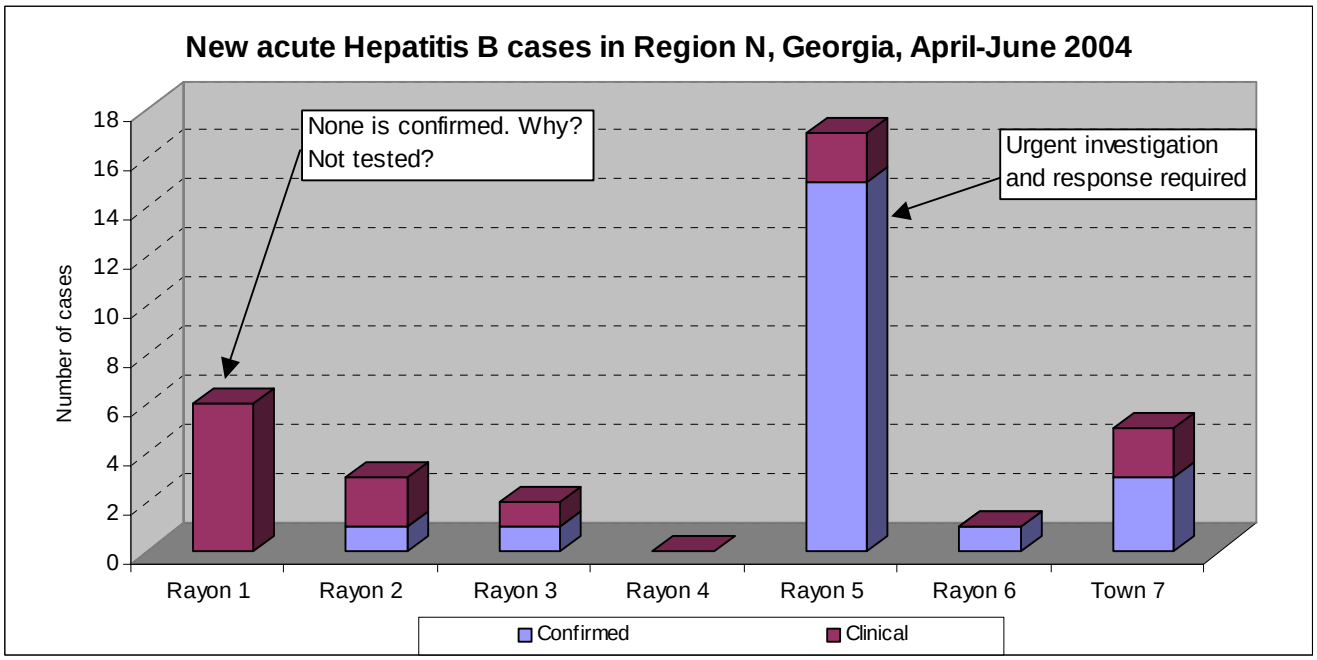
5.3.4 Case/Death Breakdown by Place

Analyzing data according to place (where disease is occurring) can help determine why and how it is spreading. Routine analyses are typically performed by the CPH on a quarterly or yearly basis. However, during large disease outbreaks, it is recommended that individual health facilities use local maps to mark the location of clinical (probable) and confirmed cases and other sites that might be relevant for the given disease (e.g., schools, markets, water supply sources). See Figure 12 for a sample analysis.

The analysis can help managers identify "problem" areas that require priority attention and help them advocate for the most rational allocation of resources for corrective and prophylactic measures. Zero or low case confirmation rates may be indicative of poor health worker adherence to existing case management protocols, and this would also need to be corrected.

It should be noted that comparative analysis of morbidity by place based on absolute number of cases may distort the true disease morbidity picture; comparing incidence rates is more illustrative. Incidence rate is discussed below, in Section 5.3.6.

Figure 12. Example of Graph Showing Case Breakdown by Location



5.3.5 Case/Death Breakdown by Age Group and Immunization Status

Analyzing data by personal information of the individual can help further narrow the group at greatest risk and indicate potential risk factors.

Worksheets facilitating such analysis are included in the workbook designed for CPHs and polyclinic ambulatory units (PAUs) (Figure 13.)

Figure 13. Example of Case Breakdown by Person (Age Group and Immunizations)

Immunization Status of Acute Hepatitis B Cases in Rayon 5, April-June 2004:

Immunized - 1 (6%)

Not immunized - 16 (94%)

Total cases: - 17 (100%)

Acute Hepatitis B cases in Rayon 5 by age group, April-June, 2004

Age group	under 1	1--4	5--14	15--19	20--29	30--54	55+	TOTAL
No. of cases	0	0	0	4	12	1	0	17

Most of the hepatitis B cases (94%) are in age group 15-29 yrs

Armed with this information, managers can more easily target response interventions such as catch-up immunization or prophylactic education. It also helps in allocating scarce available resources in the most appropriate way to combat the disease.

5.3.6 Incidence Rates

As noted above in Section 5.3.4, using disease incidence rate as the basic measure of disease occurrence is more reliable than using the absolute number of cases of the disease in a population. For example, village X (with 500 population) registers five measles cases in a given period; village Y (with 1,000 population) also registers five measles cases in the period. If case numbers alone are compared, one might conclude that the disease is equally pervasive in the two settings, whereas, in fact, the disease incidence rate is twice as high in village X as in village Y.

Incidence rate is defined as the number of new cases occurring during a given time period (usually a calendar year) in a population at risk, i.e., susceptible for developing a particular disease. Population at risk might be the population of a rayon, a region, or a country; the number used is usually the population at mid-year. Incidence rates are expressed as the number of new cases per 1,000, 10,000, or 100,000 population, depending on the condition being measured. Communicable disease incidence rates are routinely measured per 100,000 population. The rate is calculated as follows:

$$\textit{Incidence per 100,000} = \frac{\textit{No. of new cases occurring during one year} \times 100{,}000}{\textit{Population at mid-period}}$$

Example:

Rayon	Rayon 1	Rayon 2	Rayon 3	Rayon 4	Rayon 5
Number of new mumps cases in 2004	2	6	3	2	6
Population in 2004	50,000	20,000	60,000	40,000	60,000
Incidence per 100,000	4	30	5	5	10

High-risk territory. Concentrate control efforts there.

Incidence rates typically

- allow public health managers to monitor disease occurrence over time in various territories, and
- help them determine who is at greatest risk of a given disease and what are potential risk factors (in such cases age, sex, and other population group-specific incidence rates prove to be the most useful).

In order to describe epidemiological process in more detail other factors such as age, sex, occupation, and immunization status are used. This helps managers to determine specifically which population groups are at greatest risk.

Age, occupation, and other factor-specific incidence rates can be determined accurately only if reliable statistical data on denominators (size of specific population groups) are available. Worksheets facilitating such analysis can be found in the workbook for CPH and PAU health workers

For example, the 1994-1995 diphtheria incidence rate in Georgia for children under 14 reached 15-16 cases per 100,000 population. However, incidence rates were also very high among adolescents 15-19 years old (9-10 cases per 100,000) and among adults 20-49 years old (about eight cases per 100,000). These rates indicated the necessity to implement a mass immunization for the entire population.

As another example, the incidence rate of hepatitis B is very likely to be much higher in health personnel of surgical departments, injecting drug users, and others at risk. In order to calculate the incidence rate, the numerator for this equation would be, for example, the number of new cases among health personnel of surgical departments. The denominator would be the total number of health personnel of surgical departments. This incidence rate can be compared to the incidence rate calculated for other departments, which presumably will show that personnel performing surgical manipulations are at greater risk for contracting hepatitis B. Such analysis can help to demonstrate that vaccination and other prevention efforts should be targeted at these groups.

5.3.7 Case Confirmation Rates, Proportion of Cases Lab Tested

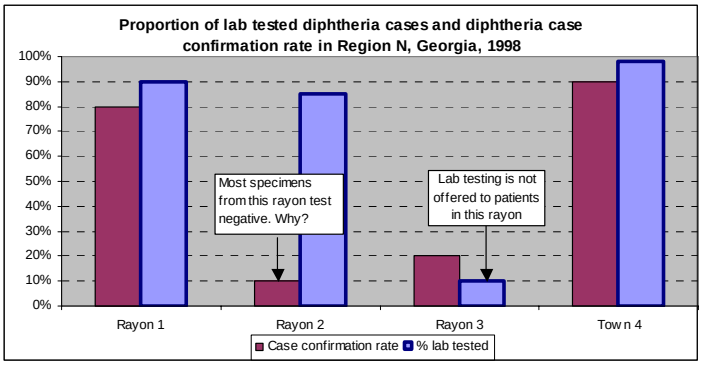
In a well-functioning surveillance system, disease confirmation rates are expected to exceed 70 to 80 percent. For diseases in the elimination phase (polio, measles), this rate is expected to approach 100 percent, as shown in the following equation:

$$\textit{Case confirmation rate} = \frac{\textit{No. of confirmed cases}}{\textit{Total number of cases}} \times 100\%$$

As mentioned earlier in the case definition/case classification section, a confirmed case is one that has been confirmed by disease-specific laboratory tests and/or where an epidemiological link to other laboratory-confirmed case(s) has been established. In those instances where lab confirmation of a disease is not widely accessible, cases can be confirmed if they meet a clinical description of the disease and are epidemiologically linked to a clinical (probable) case (e.g., mumps, rubella). For some diseases (e.g., tetanus), definition of a confirmed case is not applicable because there is no lab test and no epidemiological link – they are confirmed based purely on clinical presentation.

Computation of case confirmation rates (see Figure 14 for an example) is recommended primarily for the regional and national surveillance managers to assess the maturity of the surveillance system in various regions and in various settings, assess the success of disease elimination efforts, plan surveillance/laboratory system-strengthening activities, develop disease elimination strategies, suggest policy changes, and plan other long-term interventions such as mass immunization campaigns. These are decisions for which health managers cannot rely on reports that include unconfirmed cases.

Figure 14. Graphic Illustration of Rates of Confirmed Diphtheria Cases



Monitoring of the proportion of cases that have been laboratory tested is important, first and foremost, for diseases targeted for elimination or considerable reduction (e.g., polio, measles, diphtheria).

It is recommended to calculate proportions of laboratory-tested and -confirmed cases separately. Their comparative analysis will help to identify poorly performing facilities/laboratories or rayons, research potential reasons for this, and implement plans for improving performance. The suggested equations are as follows:

$$\textit{Proportion of laboratory-tested cases} = \frac{\textit{No. of cases of a given disease that were lab tested}}{\textit{Total no. of clinical (probable) cases of this disease}} \times 100\%$$

$$\textit{Proportion of lab-confirmed cases} = \frac{\textit{No. of laboratory-confirmed cases}}{\textit{Total no. of clinical (probable) cases of this disease}} \times 100\%$$

$$\textit{Proportion of lab samples confirmed} = \frac{\textit{No. of laboratory-confirmed cases}}{\textit{No. of cases of a given disease that were lab tested}} \times 100\%$$

5.3.8 Vaccination Efficacy

The ability of a vaccine to prevent disease depends on its potency and proper administration to an individual capable of responding. Such field assessments of vaccine efficacy can be very useful, particularly when doubt is cast on the efficacy of the vaccine because of the occurrence of disease among vaccinated persons.

The term “vaccine efficacy” describes ability of a vaccine to prevent disease after vaccine administration. Methodology described below can be used for the vaccines given once (e.g. measles, mumps).

In order to define vaccine efficacy (VE), for example, for measles vaccine, the following information is required:

1. The study population is children aged 24-35 months. This age group should have been 12-24 months old last year. The data can be obtained from the population by age groups report (form 2.2.)

2. Measles vaccination coverage rate in children under 24 months of age. The data can be taken from GEOVAC or respective workbooks. The study population should have received vaccination last year.

3. The number of vaccinated children aged 24-35 month old who contracted the disease.

4. The number of unvaccinated children aged 24-35 month old who contracted the disease

After getting the above information the following calculations should be done:

a) The total number of vaccinated children is the study population (children aged 24-35 months) x coverage rate

b) The total number of unvaccinated children is the study population (children aged 24-35 months) minus the number of vaccinated children.

$$\textit{Incidence for vaccinated} = \frac{\textit{No. of\_vaccinated children aged 24-35 months who got the disease}}{\textit{Total no. of vaccinated children}}$$

$$\textit{Incidence for unvaccinated} = \frac{\textit{No. of unvaccinated children aged 24-35 months who got the disease}}{\textit{Total no. of unvaccinated children}}$$

$$\textit{VE} = \frac{\textit{Incidence for unvaccinated} - \textit{Incidence for vaccinated}}{\textit{Incidence for unvaccinated}}$$

When calculating VE for the vaccines requiring multiple injections (e.g., DPT, OPV) full vaccination should be considered. Children who completed vaccination series (3 doses) should be compared to those who did not receive even one dose of the vaccine.

The efficacy of the children's vaccines, if given as suggested in the immunization schedule, is typically in the 80 to 95 percent range. If it is much lower, health managers should investigate possible reasons why (cold chain failure, improper vaccine administration). If it is low for a number of vaccines, such an investigation is urgent.

Since vaccines are usually less than 100 percent efficacious (some people will fail to seroconvert initially, immunity of others will wane with time), there always will be some cases among the immunized. As long as there is less than 100 percent vaccine coverage and the vaccine used is less than 100 percent efficacious, the number of individuals susceptible will accumulate, and this will require an ongoing follow-up immunization (either routine booster dose or periodic supplemental campaigns).

5.3.9 Timeliness and Accuracy of Reporting

For the surveillance system to function properly, reporting and subsequent decision making must be rapid. Health facilities should submit monthly reports on infectious disease morbidity and mortality not later than on the first day of the following month. Rayon CPHs have three to four days to verify, clarify, correct, and aggregate the information received (see also Section 4.3), and they must submit reports to regional CPHs not later than on the fifth day of the following month. A report is considered to be timely and accurate on the basis of the following criteria:

- A report is considered to be ***timely*** if the higher level office receives it by the established deadline.
- A report is considered ***accurate*** if it is complete and the higher level office has requested and received clarifications (if needed) and has not revealed any inaccuracies during verification through its own records (e.g., urgent notifications, case investigation protocols, and so forth).
- The report is considered complete if all the required fields are filled out (for disease cases which were registered in the reported period) and zeros are in place for the diseases not registered during the reported period.

CPH managers are encouraged to monitor timeliness and accuracy of reporting on a monthly basis using suggested tables included in the workbook (see an example in Table 7). The target is 95 percent.

Factors affecting the quality of reporting by poorly performing facilities (timeliness or accuracy <80%) need to be investigated and promptly addressed.

Table 7. Sample Monitoring Worksheet of Timeliness and Accuracy of Reporting

Subordinated facilities	TIMELINESS					ACCURACY				
	Jan	Feb	. . . .	Dec	Proportion	Jan	Feb	….	Dec	Proportion
Facility 1	X	X	X	X	100%	X	X	X	X	100%
Facility 2	X	------	------	X	50%	-----	-----	X	X	75%
Facility 3	X	X	X	X	100%	X	----	X	X	83%
. . . . .										
Facility 15	X	X	X	X	100%	X	X	X	X	100%
Total (15)	15	12	12	15		12	13	13	14	
Proportion	100%	80%	80%	100%		80%	87%	87%	93%	

5.3.10 Case/Outbreak Investigation Rate

It is recommended that regional CPH managers monitor the case and outbreak investigation rate on a quarterly and annual basis. The equation for the investigation rate is as follows:

$$\textit{Investigation rate} = \frac{\textit{No. of investigations initiated in a given time period}}{\textit{No. of times the threshold was reached during the same period}}$$

This is needed to evaluate the rayon CPH adherence to the outbreak investigation requirements. Possible barriers should be investigated and corrective measures taken if the rate is less than 90-100 percent. The rayon CPH also can conduct this type of analysis itself for self-evaluation. More details on the investigation process, including outbreak thresholds for VPDs, are provided in the next chapter.

6. Investigation of Reported Cases and Outbreaks

An investigation is aimed at identifying people who have been exposed to or affected by an infectious disease. It provides information that can be used to take immediate action to control the disease and improve long-term activities to prevent its recurrence. The information gleaned from an investigation serves to do the following:

- Verify the outbreak
- Perform the final case classification
- Identify and treat additional cases that had not been reported or recognized
- Collect information and laboratory specimens for confirming the outbreak
- Identify the source(s) of infection or cause of the outbreak
- Describe how the disease is transmitted and populations at risk
- Select appropriate response activities to control the outbreak
- Strengthen prevention activities to prevent future recurrence of the outbreak

In Georgia, the rayon CPH has primary responsibility for investigating outbreaks. In certain circumstances (minor outbreak, availability of competent staff and resources) heath facilities may undertake some or all aspects of investigations, but they must keep the rayon CPH fully informed. This chapter describes the general activities to be undertaken in investigating a case or an outbreak. More details can be found in disease-specific sections of these guidelines.

When a reported case or outbreak is identified, the following steps should be taken:

1. **Make a decision to investigate.** Case investigation should be initiated when the investigation threshold is reached.

Investigation threshold. Investigation as well as the list of notifiable diseases/cases are defined and annually updated by the NCDC on the basis of the epidemiological situation in the country (see Table A, Notification, Reporting, and Investigation Requirements for Infectious Diseases).

The rayon CPH should begin investigation as soon as possible, but not later than two business days from the time notification is received for AFP/polio, diphtheria, measles, mumps, rubella, pertussis, and rabies, and not later than three business days from notification for tetanus, hepatitis B.

2. **Prepare to conduct an investigation.** The chief epidemiologist together with the chief of the CPH decide on investigation team composition, make sure needed funds are available, and request additional technical resources.

Note: Participation of the NCDC and/or regional CPH experts or laboratory experts is required during case and outbreak investigations of AFP/polio, diphtheria, neonatal tetanus, pertussis, measles, and congenital rubella.

The team leader clarifies objectives, roles, and responsibilities, and decides where the investigation will begin (usually in the most affected place). Needed authorizations must be obtained, forms for collecting information prepared, and methods and supplies for collecting lab specimens assembled. Travel arrangements for getting to and from the site of investigation need to be made. If required, the transportation of specimens to the appropriate laboratories must be arranged as well.

3. **Verify the case/potential outbreak on-site.** Review medical records to verify that cases meet the clinical description of the disease (the definition of a clinical (probable) case). Discuss with clinician(s) if some do not so that a consensus can be reached. A case incompatible with the clinical description and not confirmed by specific laboratory tests is discarded for epidemiological surveillance purposes.

4. **Collect laboratory specimens** if this is mandated and has not been done yet. Refer to Table 8 for a summary of VPDs that trigger mandatory laboratory case confirmation and laboratory guidelines for collecting, storing, and transporting specimens. Review results with clinicians if and when the results become available to see if some of the cases could now be regarded as "confirmed." Physicians should be informed about test results, if specimen collection and case confirmation is performed through the public health services facilities.

Table 8. Epidemiologic Conditions for VPDs Triggering Mandatory Laboratory Case Confirmation

Disease	Epidemiologic Conditions under which Laboratory Confirmation Is Mandatory	Where to Send Specimens*
Diphtheria	Any probable case	Contact regional CPH for the most current list of NCDC recognized and recommended laboratories in your area
AFP/Polio	Any probable case	NCDC
Congenital rubella syndrome	Any probable case	NCDC
Measles	Any isolated probable case In case of a large outbreak, collect samples from at least 5 cases from each cluster	NCDC
Rubella	Any isolated probable case In case of a large outbreak, collect samles from at least 5 cases from each cluster	NCDC
Pertussis	Three or more probable cases** during the same period, consistent with pertussis incubation period in a given geographic territory	NCDC
Acute viral hepatitis	All clinical (probable) cases of hepatitis B Where an outbreak of hepatitis A is suspected, it is required to confirm at least one case (where all cases are epidemiologically linked) or every other case where such link can not be established	Contact regional CPH for the most current list of NCDC recognized or recommended laboratories in your area
Tetanus	No laboratory confirmation for this disease	
Mumps	Laboratory confirmation is not mandatory	

* Specimen collection should take place at the facility where a patient has come to seek care if such facility is equipped with a specimen collection kit. Referring sick patients (instead of specimens) to a laboratory is discouraged.

5. **Search for additional cases.** An active search should be conducted to determine if additional cases exist. This can be accomplished by

   a. reviewing clinic registers, requesting that health workers in neighboring facilities search for similar cases in their registers, and

   b. identifying areas of likely risk where the patients have lived, worked, or traveled during their infectious period, and visiting those places to speak to the contacts to find out if anyone else in the area around the case has been ill with signs or symptoms that meet the case definition.

Any newly identified cases must be referred to the health facility for treatment and notified/registered accordingly by CPH.

The number of susceptible contacts determines the potential for secondary transmission. Follow-up should be conducted until the end of the incubation period for that disease.

6. **Analyze the data concerning the outbreak**. The methods of analysis and presentation of outbreak data are described in the previous chapter of the guidelines. Data about the outbreak can be reanalyzed many times during the course of an outbreak. The initial analysis usually focuses on where the outbreak is occurring, to where it is spreading, the source of infection and the persons at risk of becoming ill. The data could be presented in a histogram representing the course of the disease; cases could be plotted on a spot map; where necessary, tables of the most relevant characteristics of cases could be made (e.g., comparing age group with vaccination status).

During an outbreak, these data will need to be updated frequently (often daily) to see if the information received changes the ideas regarding the causes and control strategies for the outbreak.

7. **Implement control and prevention measures.** Such measures are discussed in detail in the disease-specific sections of the guidelines.

8. **Prepare and submit** (to the NCDC and regional CPH) a **report on investigation findings** along with routine monthly reports.

   The report should include:

- Case/Outbreak Investigation Card.
- Cluster Investigation Report (if group cases[2] have occurred)

The **Cluster Investigation Report** should contain the following information:

- Date outbreak started, time distribution of cases (days, weeks), description of the affected territory
- Number of affected individuals during outbreak; their age, gender, social distribution, division by disease onset (1, 2, 3, and more days); results of laboratory investigation
- Confirmed or probable source of infection

[2] Group cases imply three or more cases occurring simultaneously in one or more facilities in one incubation period, epidemiologically linked or caused by one agent. In this case one urgent notification card should be filled out with an indication of the group case.

- Confirmed or probable way of transmission, conditions that supported spread of disease, laboratory investigation results of the environment

- Response and preventive measures (door-to-door visits, immunizations, preventive treatment such as antibiotics and bacteriophags), lab investigation of contacts, isolation of suspected individuals.

Information about group cases and outbreaks should be submitted to the local health administration, and other decision makers or stakeholders who need this information in a verbal or written form.

According to the current regulations, all laboratories in Georgia (including private laboratories) are required to immediately inform respective territorial CPHs of the results of any positive tests for VPDs and other communicable diseases (listed in Table A). Twice a year the regional CPHs are required to update lists of laboratories performing surveillance functions.

7. Preparedness and Organization of Response to Outbreaks

Being prepared to respond to outbreaks and other public health priorities, that is, having procedures and resources in place in advance of a disease outbreak, will increase the efficiency and effectiveness of the response to the problem.

7.1 General Preparedness Activities

There are many suggested general preparedness activities that can be performed, some in advance of an outbreak of disease. These activities are summarized below:

1. **Plan and coordinate response activities at the rayon level**. This will be undertaken by the ***Permanent Commission for Combating Socially Dangerous Diseases*** (Presidential order #207 30 April 1999). Recommended composition of the commission is as follows:

    - Head of local administration
    - Head of local self-administration
    - CPH (director, epidemiologist, immunization manager)
    - Health administration
    - State Sanitary Supervision Inspection
    - Laboratory service
    - Rayon hospital and PAU
    - Rayonal education department
    - Nongovernmental organizations and private sector
    - Representatives of other agencies (Such representatives should be invited on as-needed basis; e.g., water supply, veterinary service, assistance to internally displaced persons and refugees, police, and others.)

The commission would meet on a routine basis to do the following:

- Review surveillance and vaccination coverage data for trends that cause a public health concern
- Review and update inventory of supplies needed for disease response and make sure they are ready for use (including medicines, antitoxins, vaccines, syringes, supplies for collecting and transporting specimens, lab supplies)
- Review other resources (personnel, transport, communications) and identify material and training needs
- Determine concrete roles and responsibilities of different services/agencies for response actions
- Update local response procedures and protocols

The rayon CPH typically will manage sporadic cases of notifiable diseases and small outbreaks on its own. In the event of a large outbreak, the commission should meet as soon as the outbreak is recognized and continue to hold meetings as often as needed to plan, implement, monitor, and report on the response to the outbreak. Based on the type of causative agent and the spread of an outbreak, central and/or regional level involvement should be considered.

2. **Secure availability of financial resources at a certain minimum level *at all times* to** support investigation and control activities as well as to ensure that there is a safe minimum stock of medicines, antitoxins, vaccines, and laboratory supplies. Central funds will be used in case of national significance outbreaks.

3. **Update and maintain personnel skills** to carry out response through retraining. Training topics should depend on locally identified priorities and the epidemiological situation.

4. **Develop and deliver community education messages or campaigns.** Community education messages should be developed to help the population know how to recognize the illness in question, how to prevent its transmission, and when to seek treatment. These messages should be clear, be concise, and address beliefs about the disease. Appropriate communication methods, such as the following, should be selected:

    - Newspapers
    - Television
    - Presentations at schools
    - Meetings with health personnel and trusted and respected community, religious, and political leaders

7.2 Response Procedures

Some aspects of response to disease outbreaks are specific to the causative agent, and these are described in detail in Chapter 10. However, there are general measures applicable to all outbreaks, regardless of the agent. When a large outbreak is confirmed, the epidemic management committee should implement a number of general response measures, such as the following:

- Ensure proper involvement of health facilities and other units in the affected areas. Be sure to assign clear responsibilities to individuals and units for specific response activities.
- Obtain additional emergency response funds from the regional or national level as needed.
- Alert nearby rayons or catchment areas about the outbreak and coordinate the response efforts.
- Monitor outbreak control management. Make sure that the staff at each facility know and use the recommended disease outbreak control protocols and that the disease is laboratory confirmable.
- Verify and fill gaps in health staff skills. On-the-job and one-on-one training may have to be carried out as appropriate.
- Inform, educate and involve the community in efforts to control an outbreak. Educate the public to calm any fears and encourage cooperation with the outbreak response team. Meet community leaders. Use local TV channels, radio and mass media. Prepare appropriate message to be used by mass media in advance.

8. Feedback and Dissemination of Analyzed Data

In Georgia, data are reported routinely from the facilities upward through the system to the national level. Analyzed data and feedback should be sent regularly to lower levels. If lower level staff do not receive information that shows how the data they reported were used or what the data meant, they may think that their reporting is not important. This may result in their being less motivated to collect and report reliable data. In other words, feedback reinforces the health staff's participation in the surveillance system. Feedback also raises awareness about certain diseases and any achievements of disease control and prevention activities in the area. Feedback should be regular and timely at all levels of the health delivery system.

Feedback can be verbal, as in a telephone call, staff meeting, or supervisory visit; ***or it can be written,*** as in a report, fact sheet, or bulletin.

The rayon CPH, under normal circumstances, may predominately use oral feedback to facilities, emphasizing the data quality and the likely conclusions for the health facility and rayon as a whole that can be drawn from the reported data. The need for written feedback (reports, fact sheets) may increase during a large outbreak.

The regional CPH is recommended to use both oral and written feedback on a regular basis. Monthly meetings with rayon CPH directors should be used to jointly discuss epidemiological trends, findings of latest data analysis, and performance of individual rayons, as well as to follow up on the technical issues raised during phone call and supervisory visits.

Written analyses of the epidemiological situation and the functioning of the surveillance system in the region, highlighting actions needed to improve performance and other recommendations, should be produced every six months and disseminated to all the stakeholders in the region and rayons (e.g., Permanent Commission for Combating Socially Dangerous Diseases). Written outbreak response reports prepared by those who led the investigation could be disseminated to the same target audience after the response has taken place.

9. Supervision, Performance Monitoring and Evaluation

This chapter describes how to routinely monitor and evaluate the performance of the surveillance system at the facility and rayon CPH levels in order to improve the surveillance system functioning.

9.1 Facility Level

Table 9 includes questions for a semiannual CPH evaluation of facility performance in the area of disease surveillance in order to accomplish the following:

- Identify problem areas
- Plan adequate interventions to address these issues
- Monitor how successful a facility is in taking corrective actions

In order to prepare for a supervisory visit, it is recommended that CPH staff review and bring with them relevant copies of the journal 60, copies of reports received from facilities, as well as their workbooks. Supervisions and evaluations should be carried out in an encouraging atmosphere. CPH personnel should provide clarification, explanations, and support as necessary, and should assist in finding reasonable and acceptable solutions to improve the system. The questions addressed in Table 9 also can be used by the facilities themselves to self-monitor their work.

Table 9. Sample Facility Performance Evaluation Form

Availability of Surveillance Documentation, Registers, and Forms	
1. Does the facility use the standard infectious diseases register journal 60/A ?	Yes ☐ No ☐
2. Does the facility have at least one copy of the urgent notification card?	Yes ☐ No ☐
3. Does the facility have at least one copy of the monthly reporting form?	Yes ☐ No ☐
4. Does the facility have the MoLHSA guidelines for surveillance?	Yes ☐ No ☐
5. Does the facility have the MoLHSA lab guidelines for specimen collection and transportation?	Yes ☐ No ☐
Adherence to Notification and Reporting Requirements	
6. Prepare a list of infectious disease cases, for which urgent notifications were sent by this facility in the past 6 months. Check clinical registers randomly for the corresponding information. Has this facility always sent urgent notifications about notifiable diseases?	Yes ☐ No ☐
7. Has submission of an urgent notification been ever delayed for more than 24 hours? Verify using clinical records.	Yes ☐ No ☐
8. Have forms 58/3 for the past 6 months been always submitted prior to the established deadline?	Yes ☐ No ☐
9. Are all the forms 58/3 for the past 6 months complete and accurate? Verify using the clinical records.	Yes ☐ No ☐

Adherence to Laboratory Confirmation Requirements	
10. Is this facility able to collect sputum, stool and blood?	Yes ☐ No ☐
11. Does this facility have the capacity to handle sputum, stool, blood, until shipment?	Yes ☐ No ☐
12. Does this facility have the capacity to ship specimens to a higher level lab (e.g., presence of packing materials and transport media)?	Yes ☐ No ☐
Data Analysis Disease Prevention and Control Activities	
13. Does this facility perform analysis of epidemiological data (observe), for example morbidity trends by time [only for facilities serving more than 5000 people]?	Yes ☐ No ☐
14. Using the VPD surveillance workbook, check the case confirmation status (lab. confirmation or establishment of an epidemiological link) for all VPDs reported by this facility in the past 6 months. Is the case confirmation rate higher than 80%?	Yes ☐ No ☐

Rayon CPH supervisors should make a clear decision ("yes" or "no") with regard to every question listed whether fulfillment of the point conditions is ensured or not. Whenever the answer is "no," they should indicate what exactly is wrong and provide recommendations that will allow a facility to correct the mistakes in the future.

Analysis of the facility evaluation questions in a summary table (see Table 10) will help the rayon CPH identify problems or issues common for most of the facilities in their service area and target corrective interventions or follow-up training, respectively. The summary table is also a good instrument to use to track the performance of individual facilities over time and monitor progress towards improving the functionality of the surveillance system in the country.

Table 10. Summary of Facility Evaluation Questions

Health Facility	Date of visit	NUMBER OF QUESTIONS IN THE CHECK LIST													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
FAP-1	2/1/2004	+	+	+	+	+	+	+	+	+	+	+	+	+	+
FAP-2	2/2/2004	+	+	+	+	+	--	+	+	+	+	+	+	--	+
PAU	2/3/2004	+	+	+	+	+	--	+	+	+	+	+	--	--	--
TOTAL	No. of answers	3	3	3	3	3	1	3	3	3	3	3	2	1	2
	% of answers "YES"	100	100	100	100	100	33	100	100	100	100	100	66	33	66

9.2 Rayon CPH Level

Table 11 includes questions for the evaluation of a rayon CPH's performance in the area of disease surveillance by a region CPH. The aim of such evaluations is similar to those at the facility level:

- Identify problem areas
- Plan adequate interventions aimed at addressing these issues
- Monitor how successful a rayon is in taking corrective actions

Supervisions and evaluations should be carried out in an encouraging atmosphere. The regional experts should provide needed clarification, explanations, and support as necessary, and should find reasonable and acceptable solutions to improve the system. The questions provided in Table 11 also can be used by the rayon CPHs themselves in self-monitoring their work.

Table 11. Sample Rayon CPH Evaluation Form

Availability of Surveillance Documentation, Registers, and Forms	
1. Does the CPH use the standard infectious diseases journal 60/B ?	Yes ☐ No ☐
2. Has the CPH lacked urgent notification cards at any time in the last 6 months?	Yes ☐ No ☐
3. Has the CPH lacked monthly reporting forms at any time in the past 6 months?	Yes ☐ No ☐
4. Does the facility have the MoLHSA guidelines for surveillance?	Yes ☐ No ☐
5. Does the facility have the MoLHSA lab guidelines for specimen collection and transportation?	Yes ☐ No ☐
Adherence to Notification and Reporting Requirements	
6. Prepare a list of infectious disease cases, for which urgent notifications were sent by this CPH in the past 2-3 months. Check journal 60/B randomly for the corresponding information. Has this CPH always forwarded urgent notifications about notifiable diseases?	Yes ☐ No ☐
7. Has submission of an urgent notification been ever delayed for more than 24 hours?	Yes ☐ No ☐
8. Have the monthly reports for the past 6 months been always submitted prior to the established deadline?	Yes ☐ No ☐
9. Are all the monthly reports for the past 6 months complete and accurate? Verify using the journal 60/B and copies of forms 58/3 submitted by facilities.	Yes ☐ No ☐
10. Have case-based investigation reports been submitted for all cases that require submission of such reports (see Table A)?	Yes ☐ No ☐
11. Have the investigation reports been always submitted prior to the established deadline in the past 6 months?	Yes ☐ No ☐
Adherence to Laboratory Confirmation Requirements	
12. Does the rayon have the capacity to transport specimens to a higher level lab?	Yes ☐ No ☐
13. Has this rayon reported cases of diseases requiring lab testing in the past 6 months? Check monthly reports and register 60/B. If answer is "yes" go to Q14, If "no," go to Q16.	Yes ☐ No ☐
14. Were specimens collected? If answer is yes go to 15, If no go to 16	Yes ☐ No ☐
15. Were test results received ?	Yes ☐ No ☐
Data Analysis	
16. Does this CPH perform analysis of epidemiological data by time? Observe.	Yes ☐ No ☐
17. Does this CPH perform analysis of epidemiological data by place? Observe.	Yes ☐ No ☐
18. Does this CPH analyze timeliness and accuracy of forms 58/3 received from facilities? Observe.	Yes ☐ No ☐

19. Does this CPH analyze case confirmation rates (lab+ epid. link) by disease?	Yes ☐ No ☐
20. Does this CPH have appropriate demographic data at site (check availability of the population by age report) ?	Yes ☐ No ☐
Case Outbreak Preparedness, Investigation, and Response	
21. Is the case/outbreak investigation rate in this rayon higher than 90%? Check the last 6-month period.	Yes ☐ No ☐
22. Has the start of investigation ever been delayed beyond the recommended period in the past 6 months?	Yes ☐ No ☐
23. Does the rayon have a permanent commission for combating socially dangerous diseases?	Yes ☐ No ☐
24. Has the rayon had a 2 months' supply of all vaccines at all times in the past 6 months?	Yes ☐ No ☐
25. Can the rayon CPH give convincing examples how their analysis of routine data resulted in a management decision and response action in the past 6 months?	Yes ☐ No ☐
26. Can the rayon CPH give fresh examples of delivering community education materials and messages based on the current epidemiological situation?	Yes ☐ No ☐
27. Has the rayon been always able to implement VPD case/outbreak control protocols recommended by these guidelines in the past 6 months (if "No" specify a reason: shortage of vaccines, drugs or supplies?, lack of funding?, trasnport means?)	Yes ☐ No ☐
28. Did you provide on the job training to rayon CPH staff in the surveillance guidelines during monitoring visits?	Yes ☐ No ☐
29. Has the CPH carried out a formal training for rayon providers in the surveillance guidelines?	Yes ☐ No ☐
Feedback and Supervision	
30. Can the rayon CPH provide examples of mechanisms it uses to provide routine/ regular feedback to health facilities and other rayon stakeholders? If yes, specify:	Yes ☐ No ☐
31. Does the rayon CPH have evidence of making supervisory visits to more than 80% of the facilities involved in the surveillance work on its service territory?	Yes ☐ No ☐

Answering "No" to any of the questions requires clarification and discussion about what exactly is wrong and a provision of recommendations that will allow rayon CPHs to correct the mistakes soon.

The regional CPH may use summary tables as recommended above to identify problem questions (issues) common for most of the rayons in their region and target corrective interventions or follow-up training accordingly. The summary table is also a good instrument to track the performance of individual rayons over time and monitor their progress towards improving the functionality of the surveillance system in the country.

Table A. Notification, Reporting, and Investigation Requirements for Infectious Diseases

#	name	Code ICD-10	All inst/ prov. rendering healt. services	health facilites	CPH						
			notification		notification	routine reporting		investigation		investigation reporting	
			urgent	monthly	urgent	monthly	annual	threshold	time	case-based	group cases
1	Diphtheria	A36	L*					1 case	1-48 hr		
2	Pertussis	A37	L					1 case	1-48 hr		
3	Neonatal Tetanus	A33						1 case	1-48 hr		
4	Tetanus	A34-35						1 case	1-72 hr		
5	AFP / Acute poliomyelitis	A80	L					1 case	1-48 hr		
6	Measles	B05	L					1 case	1-48 hr		
7	Rubella	B06	L					1 case	1-48 hr		
8	Congenital rubella syndrome	P.35.0	L					1 case	1-48 hr		
9	Mumps	A37	L					1 case	1-48 hr		
10	Acute viral hepatitis A	B15	L					3 case	1-48 hr		
11	Acute viral hepatitis B	B16	L					1 case	1-72 hr		
12	Acute viral hepatitis C	B17.1	L					3 case	1-72 hr		
13	Acute viral hepatitis E	B17.2	L					3 case	1-48 hr		
14	Cholera	A00	L					1 case	1-48 hr		
15	Typhoid fever	A01	L					3 case	1-48 hr		
16	Paratyphoid fevers A, B, C;	A01.1-4	L					3 case	1-72 hr		
17	Other Salmonella infections	A02	L					3 case	1-72 hr		
18	Shigellosis	A03	L					3 case	1-48 hr		
19	Other baqterial intestinal infections	A04	L					3 case	1-48 hr		
20	among them: Esherichiosis	A04.4	L					3 case	1-48 hr		
21	Yersiniosis	A04.6	L					3 case	1-48 hr		
22	Food-borne bacterial intoxications	A05	L					3 case	1-48 hr		
23	Botulism	A05.1	L					1 case	1-48 hr		
24	Unspecified infectious diarrheal diseases	A09						3 case	1-48 hr		
25	Plague	A20	L					1 case	1-48 hr		
26	Tularemia	A21	L					1 case	1-48 hr		
27	Anthrax	A22	L					1 case	1-48 hr		
28	Brucellosis	A23	L					1 case	1-48 hr		
29	Leptospirosis	A27	L					1 case	1-72 hr		
30	Listeriosis	A32	L					1 case	1-72 hr		
31	Meningococcaemia	A39.2	L					1 case	1-48 hr		
32	Meningitis total		L		**			1 case	1-48 hr	**	**
33	of them N. meningitids	A39.0	L					1 case	1-48 hr		
34	Haemophilus Influenza B	G00.0	L					1 case	1-48 hr		
35	S.pneumoniae	G00.1	L					1 case	1-48 hr		
36	M. tuberculosis	A17.0	L					1 case	1-48 hr		
37	other bacterial menigitis		L					1 case	1-48 hr		
38	Relapsing fever	A68	L					1 case	1-72 hr		
39	Lyme Disease	A69.2						1 case	1-72 hr		
40	Flea- borne typhus	A75	L					1 case	1-72 hr		

41	Q fever	A78	L					1 case	1-48 hr		
42	Rabies	A82	L					1 case	1-48 hr		
43	Unconfirmed Viral infections of CNS	A89						1 case	1-48 hr		
44	Arthropods transmitted viral fevers and viral hemor. fevers	A90-A99	L					1 case	1-48 hr		
45	Yellow fever	A95	L					1 case	1-72 hr		
46	Malaria;	B50-54	L					1 case	1-48 hr		
47	Trichinosis;	B75	L					1 case	1-48 hr		
48	Hospitalized cases of Influenza-like illness	J- 06.3; 22; 10; 10.1; 11; 11.1; 12; 12.1;						1 case	1-48 hr		
49	Fever of unknown etiology (t>38 and lasts more that 5 days)	R - 50.0; 50.1; 50.9.						1 case	1-72 hr		
50	Radiological lesions	W88;91	L								
51	Acute occupational poisonings	Z 57.4 - 57.5	L								
52	Post vaccination unusual reactions and complications	Y58-59; 64.1						1 case	1-48 hr		
53	Intrahospital infections	Y95	L					1 case	1-48 hr		
54	Isolations of vancomycin resistant staphylococcus		L								
55	Severe Acute Respiratory Syndrome		L					1 case	1-48 hr		
56	Fatal cases of acute infectious diseases							1 case	1-48 hr		
57	Contact with animals (risk of							group / CRA**	1-48 hr		
58	Group cases of Inf. disease****										
59	Acute Respiratory Infections	J00-J06									
60	Influenza	J10-J11									
61	Amebiasis	A06									
62	Scarlet fever	A38									
63	Varicella	B01									
64	Other viral hepatitis	B17.0; 17.8									
65	Chronic viral hepatitis B	B18.0-18.1									
66	Chronic viral hepatitis C	B18.2									
67	Cytomegalovirus infection	B25									
68	Inf. mononucleosis	B27									
69	Leishmaniosis	B55									
70	Echinococcosis	B67									
71	Ascariasis	B77									
72	Trichocephalosis	B79									
73	Enterobiasis	B80									
74	Bites of a toxic snake	X20									
75	Bites of a toxic insects	X21-25									

* L - notifucation from Laboratoreis

** only for A17.0, A39.0, G00.0, G00.1 cases

*** damage of more than one individual by one animal, or confiremd rabies in animal

**** excluding ARI and Influenza

Table B. Notification, Reporting, and Investigation Forms Submission Frequency and Deadlines

Name of the form	Frequency of submission and number of copies	Deadline (not later than)	Place of submission
Provider rendering health care services			
#58/1 **Urgent notification card**	Upon case identification. Standard form (one copy) or relevant information by any available means of communication	During the same business day or not later than within 24 hours	Rayon CPH
Laboratory			
#58/2 **Communicable disease confirmation/notification form**	Upon case identification. Standard form (one copy) or relevant information by any available means of communication	During the same business day or not later than within 24 hours	Rayon CPH
Health care facility			
#58/3 **Monthly summary notification**	Monthly (one copy)	1st day of the next month	Rayon CPH
#58/4 **HIV/AIDS special notification card (by the confirming facility)**	Upon case identification. Standard form (one copy) or relevant information by any available means of communication	During the same business day or not later than within 72 hours	
#58/5 **Tuberculosis monthly summary notification form**	Quartely (one copy)	1st day of the next month	
Rayon CPH			
#58/1 **Urgent notification card and the list of group cases (if there are group cases)**	Upon case identification. Standard form (one copy) or relevant information by any available means of communication	Same business day or not later than within 24 hours	Regional CPH NCDC
#58/2 **Communicable disease confirmation/notification form**	Upon case identification. Standard form (one copy) or relevant information by any available means of communication	During the same business day or not later than within 24 hours	Regional CPH NCDC
Investigation report: **- investigation card** **- cluster investigation report**	Monthly During cases/group cases/outbreak Investigations of selected diseases (two copies)	5th day of the next month	Regional CPH
Anti-rabies activity report	Monthly (two copies)	5th day of the next month	
AFP/ Polio active surveillance form	Monthly (one copy)	5th day of the next month	
Monthly report form	Monthly (two copies)	5th day of the next month	
Annual report form	Annually (two copies)	15th of January	
Regional CPH			
#58/1 **Urgent notification card and list of group cases (if there are group cases)**	Upon case identification. Standard form (one copy) or relevant information by any available means of communication	Same business day or not later than within 24 hours	NCDC

Name of the form	Frequency of submission and number of copies	Deadline (not later than)	Place of submission
Rayon investigation reports: **- investigation card** **- cluster investigation report**	Monthly during cases/group cases/outbreak investigations of selected diseases (forward one copy)	7th day of the next month	
Anti-rabies activity report	Monthly (forward one copy)	7th day of the next month	
AFP/ Polio active surveillance form	Monthly (forward one copy)	7th day of the next month	
Rayon and regional monthly reports	Monthly (one copy)	7th day of the next month	
Rayon and regional annual report	Annually (one copy)	20th of January	

10. Disease-Specific Prevention and Control Guidelines

10.1 Measles

10.1.1 Rationale for Surveillance

The major goals for measles surveillance at the current time are to identify high-risk areas and population groups based on analysis of susceptibility and to predict (in order to prevent) potential outbreaks. Supplementary immunization activities should be used to protect the susceptible sub-populations. Georgia has started moving toward the "measles elimination phase" in which the objective is to achieve and maintain interruption of measles transmission in the country. During this phase a very intensive case-based surveillance to detect, investigate, and confirm every suspected measles case in the community is required.

A preliminary plan for measles elimination has been developed with WHO guidance. According to the plan, elimination can be achieved through strict disease-specific surveillance procedures. Namely, it is necessary to achieve and maintain a high measles immunization coverage level (at least 95 percent) with the first and the second doses of measles vaccine and establish national surveillance of each case. Every suspected case should be investigated and laboratory tested. In the elimination phase, a "***suspected"*** case – defined as any person with fever and maculopapular rash – is treated as a measles case for surveillance purposes.

High immunization coverage with 2 doses of the vaccine can be achieved by following the immunization strategic plan in Table 12, which envisions gradual increase of coverage rates every year.

Table 12. Preliminary National Measles Immunization and Case Control Plan

Year / Result	MCV-1 Coverage		MCV-2 Coverage		Measles Control Stages according to WHO Strategic Program
	National level	In each region	National level	In each region	
2004	88%	at least 70%	76%	at least 60%	I. Development of measles surveillance and laboratory investigation guidelines and a case-based database. Lab investigation in case of outbreaks. Routine immunization activities.
2005	90%	at least 75%	80%	at least 70%	II. Use of a case-based database. Countrywide implementation of the surveillance and lab confirmation guidelines. Routine immunization activities.
2006	92%	at least 80%	85%	at least 80%	
2007	95%	at least 85%	90%	at least 85%	IIIa. National surveillance and laboratory investigation of every case. Routine and supplementary immunization activities.
2008	95%+	at least 90%	95%	at least 90%	IIIb. National surveillance and laboratory investigation of every case. Implementation of a syndrome surveillance of group cases manifested with a rash and a fever and their laboratory investigation. Routine and supplementary immunization activities.

According to WHO recommendations, countries are advised to use the Clinical Classification scheme until the following two criteria are met:

- Low levels of measles incidence
- Access to a proficient measles laboratory

After achieving above criteria or for outbreak investigation, the Laboratory Classification scheme should be used.

10.1.2 Recommended Measles Case Definition

Clinical case definition:

- Any person in whom a clinician suspects measles infection, **or**
- Any person with the following symptoms:
  - Fever **and**,
  - Maculopapular rash[3] (i.e., non-vesicular rash), **and**
  - Cough, running nose, or conjunctivitis (i.e., red eyes)

Laboratory criteria for diagnosis

- Presence of measles-specified IgM antibodies

Case classification

- **Clinical classification scheme**:
  - *Clinically confirmed:* A case that meets the clinical case definition
  - *Discarded:* A suspect that does not meet the clinical case definition
- **Laboratory classification scheme**:
  - *Laboratory-confirmed*: A case that meets the clinical case definition and is laboratory confirmed
  - *Epidemiologycally*: A case that meets the clinical case definition and is linked epidemiologically to a laboratory-confirmed case (contact with a case 7-17 days prior to the onset of symptoms.
  - *Clinically confirmed*: A case that meets the clinical case definition and for which no adequate blood specimen was taken
  - *Discarded:* A suspect case that does not meet the clinical or laboratory definition

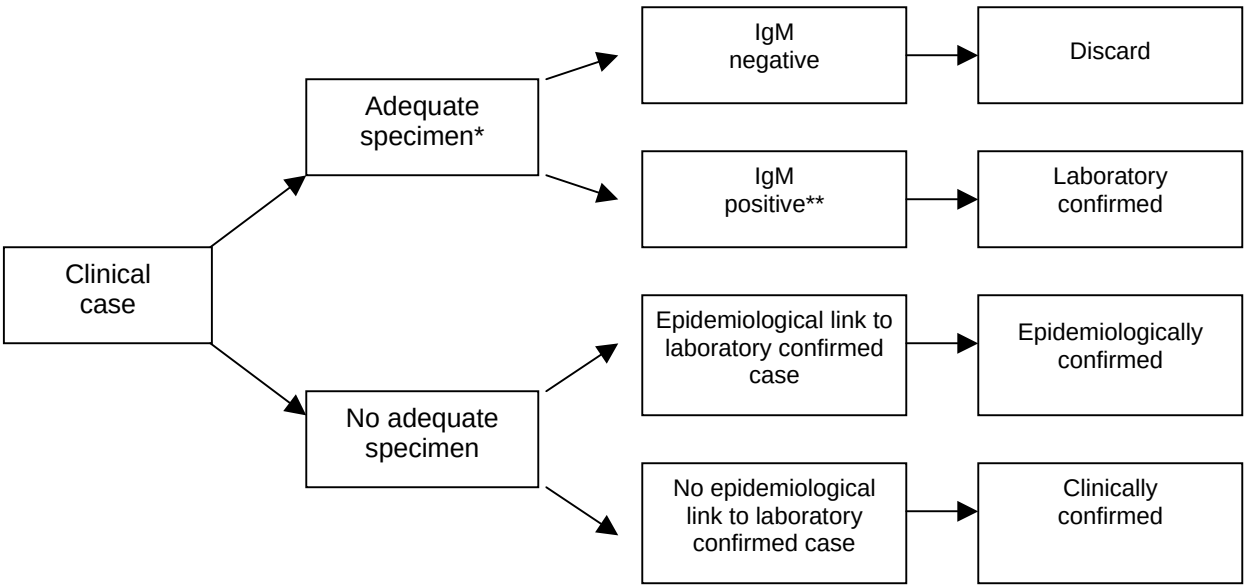
Epidemiological link is contact with a case 7-18 days prior to the onset of symptoms.

[3] Measles rash usually begins on the face and neck and over the next three days gradually proceeds downward and outwards, reaching the hands and feet

Table 13. Measles Final Case Classification Table

Clinical (probable)	Case meets clinical description
Laboratory-confirmed	Case meets clinical description and is laboratory confirmed
Confirmed by epidemiological link	Case meets clinical description and has epidemiological link to a lab-confirmed case
Discarded	Case does not meet clinical description or is not laboratory confirmed

Figure 15. Measles Final Case Classification Algorithm



* While IgM (ELISA) tests are more sensitive between days 4 and 28 after the onset of rash, a single serum sample obtained at the first contact with the health care system within 28 days after onset is considered adequate for measles surveillance.
** If the case was vaccinated within six weeks before serum collection and if an active search in the community does not find evidence of mealses transmission and there is not history of traveling to areas where measles virus is known to be circulating, the case should be discarded.
Note: Adequacy of specimens is determined by the NCDC laboratory.

Laboratory testing is currently mandated for confirmation of outbreaks when there is a clustering of three or more clinical (probable) cases. Samples can be analyzed at the NCDC. Starting in 2006 every clinical (probable) case must be laboratory investigated, and starting in 2007 laboratory investigation will be required for every clinical (probable) case and group cases manifested with fever and rash.

See Protocol for Laboratory Confirmation of Measles later in this chapter for specific steps to undertake in this respect.

10.1.3 Measles Case Notification Procedures and Forms

Any clinical (probable) case of measles identified by providers or a positive measles lab test requires urgent notification of the CPH within 24 hours by any existing means of communication. Starting in 2007, urgent notification must be made of every group case with fever and rash. General requirements are outlined in more detail earlier in these guidelines.

10.1.4 Measles Case/Outbreak Investigation

Every single reported measles case has to be investigated by a rayon CPH epidemiologist in cooperation with facility health workers within 2 business day of notification. Time is of the essence to prevent further transmission of the disease. When single cases are reported, visit of infection sites (place of residence of the patient) is required for further active revealing of cases.

The following steps are required in an investigation:

1. Verify that all cases meet the clinical description of measles by reviewing medical records.

   Discuss with the physician(s) if some do not. A case incompatible with the clinical description and not confirmed by specific laboratory tests is eliminated from epidemiological surveillance reporting.

2. Collect data as envisioned in the measles investigation card (see Figure 16).

   The collected data should be verified against the information found in the health facility's infectious disease register. It is entirely possible that the investigation will identify additional cases that have not been registered by the health facility. Facilities should continue filling out the investigation cards for all clinical (probable) cases identified.

3. Identify the source of infection and establish epidemiological links.

   Check if measles patients were in contact with a confirmed case 7-17 days prior to onset of symptoms to determine the existence of an epidemiological link.

4. Collect specimens.

   Serologic specimens should be obtained between days 4 and 28 after rash onset. However, a single serum obtained at the first contact with the health care system, regardless of which day following the rash onset this occurs, is considered adequate.

5. Assess potential for transmission and identify contacts.

   The potential for transmission is usually determined by a number of susceptible contacts. Transmissions are particularly likely in schools and other institutions where population is densely aggregated.

   - Determine dates of rash onset for each of the cases.
   - Identify all contacts of the measles patients during their infectious period (4 days before and 4 days after the rash)
   - Contacts over 9 months year of age that have not documented evidence of receiving at least one dose of measles containing vaccine are considered susceptible

6. Implement control and prevention measures (see next section).

7. Write a report and send it to the regional CPH in two copies (the region CPH will forward one copy to NCDC). This report should include:

- The first part of the Measles Investigation Card (see Figure 16) completed for each single case (number of cases in the card(s) should correspond to the number of cases indicated in the monthly report form).
- Outbreak Investigation Card, which is prepared for measles/rubella group cases (see Figure 17)

8. Inform local health administration and other stakeholders about outbreak/group cases verbally or in a written form.

Figure 16. Measles Investigation Card (part one) monthly IV-03 1/Ms

# of facility and date Registration # in NCDC Region rayon

#	Patient epidemiological number	GE	GE	GE
1.	Name (additional info[4])			
2.	Address			
3.	Rash onset date	/ / / / Date month year	/ / / / Date month year	/ / / / Date month year
4.	Sex	Female Male	Female Male	Female Male
5.	Date of birth	/ / / / Date month year	/ / / / Date month year	/ / / / Date month year
6.	Age at rash onset	Full no. of years_____	Full no. of years_____	Full no. of years_____
7.	No of received doses	_____ unknown	_____ unknown	_____ unknown
8.	Date of last vaccination	/ / / / Date month year unknown	/ / / / Date month year unknown	/ / / / Date month year unknown
9.	Date of notification to CPH	/ / / / Date month year	/ / / / Date month year	/ / / / Date month year
10.	Date of investigation	/ / / / Date month year	/ / / / Date month year	/ / / / Date month year
11.	Clinical description: **Fever**	Yes No unknown	Yes No unknown	Yes No unknown
12.	Clinical description: (underline)	Cough, coryza, conjunctivits, unknown	Cough, coryza, conjunctivits, unknown	Cough, coryza, conjunctivits, unknown
13.	Rash duration	_____ days unknown	_____ days unknown	_____ days unknown
14.	Outcome[5]	died; alive; lost to follow/up/unknown	died; alive; lost to follow/up/unknown	died; alive; lost to follow/up/unknown
15.	Hospitalization (indicate)	Yes _____ No	Yes _____ No	Yes _____ No
16.	Group case	Yes No unknown	Yes No unknown	Yes No unknown
17.	Complications	Yes No unknown	Yes No unknown	Yes No unknown
18.	Encephalitis	Yes No unknown	Yes No unknown	Yes No unknown
19.	Pneumonia	Yes No unknown	Yes No unknown	Yes No unknown
20.	Diarrhea	Yes No unknown	Yes No unknown	Yes No unknown
21.	Other	_____ unknown	_____ unknown	_____ unknown
22.	Final Classification (underline one)	1)Discarded; 2) clinical 3) Lab.confirmed; 4) epid.confirmed	1)Discarded; 2) clinical 3) Lab.confirmed; 4) Epid.confirmed	1)Discarded; 2) clinical 3) Lab.confirmed; 4) Epid.confirmed
23.	Date of spesimen collection?	/ / / / Date month year	/ / / / Date month year	/ / / / Date month year
24.	Date of lab result?	/ / / / Date month year	/ / / / Date month year	/ / / / Date month year
25.	Measles IgM	positive; negative; In process; Inconclusive	positive; negative; In process; Inconclusive	positive; negative; In process; Inconclusive

The card should be completed for each case and submitted to the region CPH before day 5 and to NCDC (Tbilisi, 380077, st. M. Asatiani #9, Tel. 37-16-77.39-64-38) before day 7 of the next month.

Responsible Person_____ (name, position) Signature_____

[4] If the information represents additional data on the case already reported, please indicate this.
[5] **Death** is defined as death due to measles or its complications within 2 months of onset of measles.

part two (to be filled and kept at CPH)				
26.	If not vaccinated, indicate reasons			
27.	Source of Infection. If known, indicate name	Indigenous; Imported; Import-related; Unknown Name_____	Indigenous; Imported; Import-related; Unknown Name_____	Indigenous; Imported; Import-related; Unknown Name_____
28.	Contact with clinical case before 7-18 days of disease onset			

Response actions			
Isolation	O yes till_____ (date) O case is no longer contagious O no	O yes till_____ (date) O case is no longer contagious O no	O yes till_____ (date) Ocase is no longer contagious O no

> 9 months old susceptible contacts (that is contacts without a history of measles vaccination)

	Name	Age	Address	Vaccination performed ?	Immunoglobulin given?
				YES-NO	YES-NO

Other outbreak control measures implemented:

1.
2.
3.

Measures performed to promote awareness of measles surveillance:

1.
2.
3.

Comments/Conclusions:

Figure 17. Measles / Rubella Group Outbreak Investigation Card
(circle relevant disease)

region _____ rayon _____ facility _____

1.	Date of onset of the first case	/ / / / dd mm yy
2.	Date of onset of the last case	/ / / / dd mm yy
3.	Total number of cases	
4.	Number of deaths* (due to measles or its complications within 2 months of onset of measles)	
5.	Number of measles cases that resulted in encephalitis	
6.	Number of cases hospitalized	
7.	*for Rubella:* number of child-bearing age (14-49) women who are cases	
8.	*for Rubella:* number of pregnant women who are cases	
9.	Number of cases with specimens sent for laboratory investigation	
10.	Number of laboratory-confirmed cases	

*__Death__ is defined as death due to measles or its complications within 2 months of onset of measles.

	Age Groups							
Immunization status	<1 y	1–4 y	5–9 y	10–14 y	15-19 y	20-29 y	30+	Age unknown
0 doses								
1 dose								
2+ doses								
Unknown number of doses								

Description of the outbreak:
Measures taken:

Responsible person (name, position) _____ Signature _____

10.1.5 Measles Outbreak Control/Response

A single measles case in Georgia is considered an outbreak and requires the following control actions from the health facility and rayon CPH:

- All exposed susceptible (that is, people older than 9 months without a documented history of measles vaccination) are at risk for infection and further transmission to others. They should be vaccinated with a measles vaccine preferably within 72 hours of exposure to provide some protection. If vaccine supply is limited, priority should be given to young children for whom the risk of death is greatest. In most cases, post-exposure vaccination is preferable to the use of immunoglobulin. However, people contraindicated to measles vaccine (e.g., pregnant women; immuno-suppressed or deficient persons), children aged 9 to 11 months should be given immunoglobulin within 6 days of exposure.

- Exposed susceptible who were not immunized and not given IG, regardless of the reason, should be recommended to be isolated from the affected settings until at least 21 days after the onset of rash in the last case of measles in that setting.

- Children with measles should be kept out of school for 4 days after the appearance of a rash. Measles patients in the hospitals should also be isolated through the fourth day of rash to reduce the exposure of other patients at high risk.

- Imposing quarantine is usually both difficult and disruptive to schools and other institutions. Under special circumstances, such as during outbreaks in schools attended by a large number of persons who refuse vaccination, quarantine measures might be warranted. However such actions are not recommended as a routine measure for control of most outbreaks. Infants should be segregated if measles occurs in an institution.

10.1.6 Recommended Scope of Routine Monthly Analysis of Measles Surveillance Data to Be Performed by CPH

(See Chapter 5 for more detailed information.)

The CPH should perform a monthly analysis of the following data:

1. Measles vaccine coverage (at 24 months and 6 years) by year and subordinated area/setting
2. Incidence rate by month, year, and geographic area
3. Measles cases by age group and immunization status
4. Case “confirmation” rate for the territory
5. Completeness/timeliness of monthly reporting

During the “measles elimination” phase, the following additional ***performance indicators*** will be analyzed and assessed:

Indicator	Target
Number of clinical cases of measles or rubella per 100,000 population	>1
Percent of all clinical cases notified ≤ 7 days of rash onset	>80%
% of cases having had an adequate epidemiological investigation within 48 hours of notification	> 80%
% of probable/clinical cases (not epidemiologically linked to a laboratory-confirmed case) with at least one specimen taken within 28 days of onset	>80%
Proportion of outbreaks/ with specimens taken from all or at least 5 cases	> 90%
% of confirmed cases with source of infection (imported, import-related, or indigenous) identified	> 80%
Number of clinical measles or rubella cases without final classification 60 days after rash onset	0

10.1.7 Principle Uses of Data for Decision Making at the Regional and Rayon Levels

The regional- and rayon-level CPHs will use the data primarily to accomplish the following:

1. Monitor incidence and coverage to track progress toward goals, e.g., decreasing incidence and increasing coverage (target 95 percent), and to identify areas of high risk or that have poor program performance

2. Describe the changing epidemiology of measles in terms of age and inter-epidemic period. Identify high-risk population groups.

3. Detect and investigate outbreaks to ensure proper response and determine why the outbreak occurred. Corrective measures will depend on the primary reason .The three major reasons are as follows:

    - Failure to vaccinate – low routine coverage, failure to provide timely post-exposure vaccination
    - Vaccine failure – people who fail to seroconvert initially (at least 5 percent of the population) and those who seroconvert but whose immunity subsequently wanes. Protective vaccine efficacy can be measured (see Section 5.3.8, on vaccine efficacy)
    - Accumulation of susceptibles – unvaccinated people and vaccine failures.

4. Determine when the next outbreak may occur due to a build-up of susceptibles and accelerate prevention activities beforehand: conduct supplementary immunization activities to target high-risk groups, such as children of a certain age group, identified through the analysis of epidemiological data (as indicated above) or sero-surveys.

5. Evaluate and improve the performance of the surveillance system (e.g., reaction time for notification, specimen collection).

PROTOCOL FOR LABORATORY CONFORMATION OF MEASLES

Sampling strategy: Collect specimen from every isolated probable/clinical case. In case of a large outbreak, collect specimens from at least 5 cases from each cluster.

Confirmation test: Serological assay. Demonstration of measles-specific IgM antibody.

Specimen to be collected: Serum or plasma

Referral laboratory: NCDC. Focal person: Nazi Chitadze Phone: 39 89 46

I. DOCUMENTATION

Supplies needed:

- ○ Journal 60/A
- ○ Marker (water resistant)
- ○ Lab investigation request form
- ○ Specimen label

Steps:

1. Create a specimen label with patient's name, identification number, date, and time.
2. Fill in a copy of a lab investigation request form with patient information (it will accompany specimen to the lab)
3. Make sure patient information has been entered in Journal 60/A and an urgent notification has been sent to CPH.

II. COLLECTION AND HANDLING

Note: Collect a single serum within 4-28 days of rash onset.

Supplies needed:

- ○ Gloves
- ○ Pipette
- ○ Vaccutainer tube with needle
- ○ Adhesive tape
- ○ Tourniquet
- ○ Band aid
- ○ Sterilizing swabs

Steps:

1. Collect 5ml of blood by venipuncture into a sterile tube (without anticoagulant) labeled with patient identification and collection date, and time.
2. Allow blood to clot.
3. Centrifuge blood at 1000g for 10 minutes to separate the serum.

   * Blood can be stored at 4-8^{0}C for up to 24 hours before the serum is separated. Do not freeze whole blood. If there is no centrifuge, blood should be kept in refrigerator until there is complete retraction of the clot from the serum.
4. Carefully remove the serum with a pipette, avoiding extracting red cells, and transfer it aseptically into a sterile labeled vial.

   * If vaccutainer tubes containing a gel (yellow cap) are used, serum does not need to be separated after centrifugation manually. (The gel will provide this function.)
5. Make sure vial is properly labeled (see Section I).

III. STORAGE

- ▲ Whole blood may be held at 4-8^{0}C if it can be transported to arrive at the testing lab within 24 hours. In other cases it should be centrifuged (if there is no centrifuge see Section II).
- ▲ Store serum at 4-8^{0}C until it is ready for shipment for up to 7 days. (Sera must be frozen at -20^{0}C for longer periods of storage; in this case, avoid repeated freezing and thawing.)

IV. TRANSPORTATION

Supplies needed:

- ○ Ziplock plastic bag
- ○ Box label
- ○ Plastic container
- ○ Cold box with ice packs

Steps:

1. Tighten the cap, apply waterproof sealing tape over the cap and top of specimen container.
2. Place specimen container in a suitably sized plastic bag (1st layer) together with a small amount of absorbent material, such as cotton wool. The bag must be sealed either using heated bag sealer or waterproof adhesive tape; as an alternative, use ziplock plastic bags. Specimens from different patients should never be sealed in the same bag.
3. Sealed bags containing the specimens should be placed inside plastic containers with screw-cap lids (2nd layer). Provided that specimens have been double-bagged properly in sealed plastic bags, specimens from several patients may be packed inside the same secondary plastic container. Additional absorbent material should be placed inside the container to absorb any leakage that may occur.
4. Sealed plastic containers should be fitted into insulated 3rd layer containers (e.g., a cold box). First, place ice packs at the bottom of the box, and, along the sides, place the plastic container with the specimen in the center, then place more ice packs on top. Make sure that the container is firmly fixed in the outer box.
5. Put the lab investigation request form in a plastic bag and place it in the outer box.
6. Label box with name, address, and telephone number of the referral laboratory and the sender.
7. Label box with the safety precautions ("Do not freeze," "Do not expose to heat," "This side up," "Biological specimen," etc.).
8. Arrange shipping date.
9. When arrangements are finalized, inform the recipient of time and manner of transport and make sure that package reaches referral laboratory within 2–3 days of specimen collection.

V. COMMUNICATING TEST RESULTS

Laboratory should communicate results to the clinician within 2 days of receiving the sample. If the result of the test is positive, it should also notify the rayon CPH.

Steps:

1. Record the results in the case history and Journal 60/A.

10.2 Rubella and Congenital Rubella Syndrome

10.2.1 Rationale for Surveillance

Public health importance of rubella relates to the teratogenic effects of primary rubella infection in pregnant women. The most serious complications of rubella result from infection during the first trimester of pregnancy. Rubella infection can affect all organs of the developing fetus and cause miscarriage, fetal death, and congenital abnormalities. Twenty percent of infants born to women infected during the first 20 weeks of pregnancy will develop a pattern of birth defects called Congenital Rubella Syndrome (CRS). Maternal infection at a very early stage of gestation (prior to week 10) almost inevitably leads to serious complications: up to 90 percent of surviving infants will be born with CRS and it will be manifested with more severe permanent structural malformations (e.g., congenital heart disease, cataracts). Infants infected with rubella late in gestation (after week 20) do not normally exhibit clinical manifestation of CRS. Such a condition, when infants do not have clinical manifestation of CRS but do have rubella IgM antibodies, is defined as Congenital Rubella Infection (CRI). Infants with CRS and CRI are infectious for the first six months of life (possibly up to one year), and they can infect susceptible pregnant women.

Currently rubella infection in Georgia has a cyclic nature. However, after implementation of rubella vaccination, transmission of the infection will decrease and periods between outbreaks will increase.

CRS is subject to registration and reporting. CRS incidence in countries not performing routine immunization (Georgia was among them till 2004) typically ranges between 1.0 to 1.5 per 1000 live births (expected number for Georgia would be 40 to 60 cases annually). Prior to 2004 no cases of CRS were diagnosed in Georgia, indicating inadequate knowledge of CRS clinical manifestations among physicians.

As Georgia has started rubella immunization, surveillance data will be used to evaluate the effectiveness of the prevention program and to identify groups of people or areas where additional disease control efforts are required to reduce disease incidence. The National Health Policy calls for the introduction of rubella immunization to prevent the consequences of rubella during pregnancy and achieve CRS incidence < 0.01 per 1000 live births. Currently rubella routine vaccination is performed according to the National Immunization Calendar with MMR vaccine.

Even after the introduction of rubella vaccinations, CRS cases will continue to register for 20 years or more, until the cohorts of vaccinated children reach childbearing age.

The four major ***strategies*** to achieve the improved CRS incidence goal are the following:

- Achieve and maintain high rubella immunization levels for children[6].
- Ensure protection of women of childbearing age, up to 30 percent of whom in Georgia may be susceptible to rubella, by
  - Routinely immunizing girls 13-14 years old (this protects future mothers directly, although it has little effect on overall transmission of rubella)

[6] Introduction of rubella vaccine into the EPI is not recommended for countries that can not sustain high vaccination coverage, because this will slow, but not interrupt rubella transmission, and susceptibility of women of childbearing age will increase. ***In Georgia, conditions for achieving and maintaining high rubella immunization levels in children are favorable.***

- Offering immunization to all women of childbearing age during family planning counselling and recommending they avoid becoming pregnant for three months after being vaccinated.

- Conduct accurate surveillance for rubella and CRS and take control measures promptly when a rubella outbreak occurs.

- Establish serological surveillance of susceptibility if resources permit to monitor (in addition to clinical surveillance) the effect of the program on susceptibility of different age groups, particularly among women of childbearing age.

10.2.2 Recommended Rubella Case Definition

Clinical description: Any patient of any age with:

- fever
- maculopapular rash, **and**
- suboccipital, cervical or post-auricular lymphadenopathy **or** arthralgia/arthritis

Rubella is not always manifested clinically.

Case classification

- ***Clinical (probable)***[7]*:* A case that meets the clinical description of rubella
- ***Confirmed:*** A confirmed case has at least one of the following:
  - ***By laboratory:*** presence of rubella-specific IgM antibodies
  - ***Epidemiologically:*** Meets the clinical description of rubella and has an epidemiological link to a laboratory-confirmed case

Laboratory testing for rubella is currently mandated for group cases (at least one case should be investigated).

Epidemiological link is defined as contact with another case 14-21 days prior to disease onset.

Pregnant women exposed to rubella should be advised to seek testing for rubella infection privately to decide if there is a need for early termination of pregnancy. Asymptomatic rubella infection can be diagnosed by a positive rubella-specific IgM antibody test or a significant rise in IgG antibody between acute- and convalescent-phase tests. The acute-phase IgG serum specimen should be collected as soon as possible after exposure, whereas the convalescent-phase IgG specimen should be collected >7 to 14 days (preferably two to three weeks) later.

[7] Up to one-third of rubella infections may be subclinical (e.g., without elevated temperature or without rash).

10.2.3 Rubella and CRS Case Notification, Procedures, and Forms

Follow the general requirements outlined in Chapter 4 of the guidelines on notification and reporting: any clinical (probable) rubella or CRS case identified by providers or a positive rubella lab test requires submission of an urgent notification to CPH within 24 hours by any existing means of communication.

10.2.4 Rubella Outbreak Investigation

Note: Every clinical (probable) or confirmed case requires an investigation by a rayon CPH epidemiologist in cooperation with facility health workers within 2 business days of notification.

The following steps should be taken (please refer to Chapter 6 on outbreak investigation for more details).

a) Verify that all cases meet the clinical description of rubella by reviewing medical records.

b) Collect data as envisioned in the rubella investigation card (see Figure 18).

The collected data should be verified against the information found in the health facility's infectious disease register 60/A. It is entirely possible that the investigation will identify additional cases that have not been registered by the health facility.

c) Identify the source of infection and establish epidemiological links.

Check if rubella patients were in contact with a clinical (probable) or confirmed case 11-24 days prior to the onset of symptoms to determine the existence of an epidemiological link.

d) Assess potential for transmission and identify contacts.

The potential for transmission is usually determined by a number of susceptible contacts. Transmissions are particularly likely in schools and other institutions where population is densely aggregated.

- △ Determine dates of rash onset for each of the cases.
- △ Identify all contacts (particularly pregnant women) of the rubella patients during their infectious period (7 days before and 7 days after the rash).
- △ Consider contacts over 9 months of age that have not documented evidence of receiving at least one dose of rubella containing vaccine as being susceptible.

e) Prepare a separate list of all women of childbearing age who are either rubella patients or contacts of a rubella case, indicating their pregnancy status, and if pregnant, the gestational age at disease onset.

f) Analyze the data about the outbreak as described in the general part of the guidelines.

The emphasis should be on identifying areas and population groups at highest risk.

g) Implement control and prevention measures (see next section).

h) Write a report and send it to the regional CPH in two copies (the regional CPH will forward one copy to NCDC). The report should include a

- The first part of the **Rubella Investigation Card** (see Figure 18) filled out for each single case (number of cases in the card should correspond to the number of cases indicated in the monthly report form)
- **Outbreak Investigation Card**, which is prepared for group cases of Measles/Rubella (see figure 17).

i) Inform local health administration and other stakeholders about outbreak/group cases verbally or in a written form.

10.2.5 Rubella Outbreak Control/Response

The goal of rubella outbreak investigation is to prevent exposure of susceptible pregnant women to rubella, and thereby prevent cases of CRS. The following control actions from the health facility and rayon CPH are required when three or more rubella cases are detected:

- Isolate patients for 5 to 7 days after rash onset and recommend that they restrict contact with pregnant women.
- Identify and vaccinate susceptible persons who have no contraindications to rubella vaccine. Immunoglobulin does not prevent rubella infection after exposure and is not recommended for that purpose.
- Recommend all pregnant women who are exposed to rubella to get serological evaluation for rubella specific IgM and IgG antibodies and immediate medical consultation.

Note: History of rubella infection in the past without serological confirmation is not reliable for assessing one's immune status.

- Obtain a list of all pregnant women, particularly in the first trimester, and counsel all of them regarding the risks for intrauterine rubella infection and recommend that they restrict their contact with persons who have rubella and not attend activities where they might be exposed to rubella for at least 6 weeks (two incubation periods) after rash onset in the last identified patient to minimize their chances of coming in contact with persons with *symptomatic or asymptomatic* rubella infection.
- Conduct outreach activities in affected communities (e.g., at workplaces or schools) and facilities that should convey
  - the seriousness of rubella infection;
  - the importance of rubella vaccination; **and**
  - the importance of persons seeking medical advice for rubella-like illness and of health workers reporting rubella.
- Promote awareness of CRS and establish active CRS surveillance (specific activities are discussed below)

10.2.6 Recommended Congenital Rubella Syndrome Case Definition

CRS is an illness manifesting in infancy, resulting from rubella infection in utero.

Case classification

Clinical (probable):

An infant for whom a qualified physician detects two of the manifestations listed in a), or one manifestation listed in a) and one or more from b):

a) Cataracts/congenital glaucoma, congenital heart defect,[8] hearing impairment (the most common defect), pigmentary retinopathy

b) Purpura, splenomegaly, microcephaly, mental retardation, meningoencephalitis, radioolucent bone disease, jaundice with onset within 24 hours after birth.

Confirmed: A case clinically consistent with rubella-specific immunoglobulin IgM antibody.

IgM will be easily detected in the first six months of life (rarely up to 1 year of age). The persistence of maternally derived rubella-specific IgG beyond 6 months (the age when they would usually have waned) can be detected in 95 percent of infants with CRS. The presence of IgG in a child over 6 months of age together with the clinical picture of CRS will be an indication of a prenatal rather than postnatal infection.

10.2.7 Recommended Congenital Rubella Infection Case Definition

Case classification

Clinical (probable): A case without clinical manifestations that has a history of rubella exposure during mother's pregnancy

Confirmed: A case with no clinical manifestations in which rubella-specific immunoglobulin M (IgM) antibody was detected

10.2.8 How to Promote Awareness of CRS and Establish Active CRS Surveillance

Cases of CRS may be identified through the following methods:

- ***Active surveillance for CRS after a rubella outbreak, initiated early in an outbreak and continued for at least 9 months after it ended.*** The CPH should follow up with all the pregnant women infected with rubella during pregnancy. Obstetricians and pediatricians, as well as ophtalmologists, otologists, cardiologists, and cardiac surgeons should be alerted to the occurrence of an outbreak and its implications, informed of the clinical (probable) case definition for CRS, provided with written guidelines or training if necessary, and supplied with appropriate notification forms. Pediatricians should be advised to screen infants attending DPT

[8] The most common defects are: patent ductus arteriosus and peripheral pulmonary artery sclerosis

immunization visits for signs of CRS and inquire about the maternal history of rubella in pregnancy.

- Retrospective review of hospital records of CRS-compatible defects in infants
- The integration of CRS studies in general surveys of disability
- Serological studies in the institutions for the deaf and/or blind

CRS case investigation should be initiated by the CPH within 24 hours of getting a notification about a single case of CRS. If the NCDC or regional CPH experts are available, they will normally assume leadership in the investigation. Case-based data should be collected as envisioned in the CRS case investigation card (see Figure 19), and blood samples should be collected from the infant.[9]

Infants with CRS are presumed to be infectious during the first year of life, so the following control measures should be instituted:

- Infants with CRS should be cared for only by personnel (e.g., caregivers, household contacts, medical personnel, laboratory workers) known to be immune to rubella; otherwise, such personnel should be immunized.
- Infants with CRS should be managed with contact isolation. Their mothers should be made aware of the potential hazard of their infants to susceptible pregnant contacts.

10.2.9 Recommended Scope of Routine Monthly Analysis of Rubella Surveillance Data to Be Performed by CPH

(See Chapter 5 for more detailed information.)

The CPH should perform a routine monthly analysis of the following data:

1. Rubella vaccine coverage in different age groups (at 24 months, at 6 years, in 14 year old girls) by year and subordinated area/setting
2. Rubella incidence rate by month, year, and geographic area
3. Rubella cases by age group and immunization status
4. Rubella and CRS case "confirmation" rate for the territory
5. Completeness/timeliness of monthly reporting
6. Rubella and CRS case investigation rate

When Georgia approaches the "rubella elimination" phase, the following additional ***performance indicators*** will be analyzed and assessed:

[9] Laboratory testing is mandatory for every detected CRS case. Serum specimens should be sent to NCDC.

Indicator	Target
Number of clinical cases of measles or rubella per 100,000 population	>1
Percent of all clinical cases notified ≤ 7 days of rash onset	>80%
% of cases having had an adequate epidemiological investigation within 48 hours of notification	> 80%
% of probable/clinical cases (not epidemiologically linked to a laboratory-confirmed case) with at least one specimen taken within 28 days of onset	>80%
Proportion of outbreaks/ with specimens taken from all or at least 5 cases	> 90%
% of confirmed cases with source of infection (imported, import-related, or indigenous) identified	> 80%
Number of clinical measles or rubella cases without final classification 60 days after rash onset	0

10.2.10 Principle Uses of Data for Decision Making at the Regional and Rayon Levels

The regional- and rayon-level CPHs will use the data primarily to accomplish the following:

1. Monitor incidence and coverage to track progress toward goals, e.g., decreasing incidence and increasing coverage (target 95 percent), and to identify groups of people or areas where additional immunization efforts are required to reduce disease incidence.

2. Where necessary, enhance the existing immunization program by ensuring protection of women of childbearing age (for example, many CRS cases could be prevented through vaccination of women of reproductive age or postpartum vaccination).

3. Determine that the absence of reported CRS cases indicates the need to intensify CRS awareness and active surveillance (see above).

4. Evaluate and improve the performance of the surveillance system (e.g., reaction time for notification, case confirmation rate, outbreak investigation rate).

5. Conduct rubella and CRS education campaigns in high schools and other settings where susceptible females might congregate.

Figure 18. Rubella Investigation Card **(part one)** **monthlyIV-03 2/Rub**

# of facility and date Registration # in NCDC Region rayon

#	Patient epidemiological number	GE	GE	GE	GE
1.	Name (additional info[10])				
2.	Address				
3.	Rash onset date	/ / / / Date month year	/ / / / Date month year	/ / / / Date month year	/ / / / Date month year
4.	Sex	Female Male	Female Male	Female Male	Female Male
5.	Date of birth	/ / / / Date month year	/ / / / Date month year	/ / / / Date month year	/ / / / Date month year
6.	Age at rash onset				
7.	No of received doses	_____ unknown	_____ unknown	_____ unknown	_____ unknown
8.	Date of last vaccination	/ / / / Date month year unknown	/ / / / Date month year unknown	/ / / / Date month year unknown	/ / / / Date month year unknown
9.	Date of notification to CPH	/ / / / Date month year	/ / / / Date month year	/ / / / Date month year	/ / / / Date month year
10.	Date of investigation	/ / / / Date month year	/ / / / Date month year	/ / / / Date month year	/ / / / Date month year
11.	Clinical description: (underline)	Fever; maculopapular rash; artralgia/artritis unknown	Fever; maculopapular rash; artralgia/artritis unknown	Fever; maculopapular rash; artralgia/artritis unknown	Fever; maculopapular rash; artralgia/artritis unknown
12.	Pregnancy (if applicable)	1) not pregnant; 2) ____wk pregant; 3) unknown	1) not pregnant; 2) ____wk pregant; 3) unknown	1) not pregnant; 2) ____wk pregant; 3) unknown	1) not pregnant; 2) ____wk pregant; 3) unknown
13.	Hospitalization (indicate)	Yes _____ No	Yes _____ No	Yes _____ No	Yes _____ No
14.	Group case	Yes No unknown	Yes No unknown	Yes No unknown	Yes No unknown
15.	Final Classification (underline one)	1)Discarded; 2) clinical 3) Lab.confirmed; 4) Epid.confirmed	1)Discarded; 2) clinical 3) Lab.confirmed; 4) Epid.confirmed	1)Discarded; 2) clinical 3) Lab.confirmed; 4) Epid.confirmed	1)Discarded; 2) clinical 3) Lab.confirmed; 4) Epid.confirmed
16.	Date of spesimen collection?	/ / / / Date month year	/ / / / Date month year	/ / / / Date month year	/ / / / Date month year
17.	Date of lab result?	/ / / / Date month year	/ / / / Date month year	/ / / / Date month year	/ / / / Date month year
18.	Rubella IgM	positive; negative; In process; Inconclusive	positive; negative; In process; Inconclusive	positive; negative; In process; Inconclusive	positive; negative; In process; Inconclusive

Responsible Person_____ (name, position)_____
Signature_____

The card should be completed for each case and submitted to the region CPH before day 5 and to NCDC (Tbilisi, 380077, st. M. Asatiani #9, Tel. 37-16-77.39-64-38) before day 7 of the next month.

[10] If the information represents additional data on the case already reported, please indicate this.

Part two (to be filled and kept at CPH)					
19.	If not vaccinated indicate reasons				
20.	Source of Infection. If known indicate name	Indigenous; Imported; Import-related; Unknown Name_____			
21.	Contact with clinical case before 11-24 days of disease onset				

Response actions				
isolation	○ yes till_____ (date) ○ is not contagious ○ no	○ yes till_____ (date) ○ is not contagious ○ no	○ yes till_____ (date) ○ is not contagious ○ no	○ yes till_____ (date) ○ is not contagious ○ no
Counseled of the risk for pregnant women	○Yes, by whom_____ ○ No	○Yes, by whom_____ ○ No	○Yes, by whom_____ ○ No	○Yes, by whom_____ ○ No

Susceptible contacts

	name	age	sex	pregnant status for all 14-49 aged women: 1) not pregnant; 2) ____ wks; 3) unknown	address	measures taken: vaccination, counseling, isolation

Other outbreak control measures implemented:

1

2

3

Measures performed to promote awareness of CRS and establish active CRS surveillance:

1.

2.

3.

Comments/Conclusions:

Responsible person _____ _____(name, position)

Figure 19. Congenital Rubella Syndrome Investigation Card

# of facility and date Registration # in NCDC autonomous rep; region rayon **monthly IV-03 3/CRS**

1	Name of child	
2	Date of birth	/ / / / Day month year Birth weight _____(grams)
3	Address	
4	Place infant delivered	
5	Clinical signs and symptoms	**Group A symptoms** / **Group B symptoms** Congenital heart disease Yes / No/ Unknown — Purpura Yes / No/ Unknown Cataract Yes / No/ Unknown — Microcephaly Yes / No/ Unknown Glaucoma Yes / No/ Unknown — Meningoencephalitis Yes / No/ Unknown Pigmentary retinopathy Yes / No/ Unknown — Jaundice Yes / No/ Unknown Hearing impairment Yes / No/ Unknown — Splenomegaly Yes / No/ Unknown Developmental delay Yes / No/ Unknown Radiolucent bone disease Yes / No/ Unknown Other abnormalities (please describe) _____ Name and contact information of physician who examined infant _____
6	Present status of infant	Living Deceased If died, when / / / / Date month year Reason:_____
7	Maternal history	Vaccinated against rubella? Yes / No/ Unknown **Was rubella lab-confirmed in the mother?** Yes / No/ Unknown **Any of the following symptoms during pregnancy?** ❖ Fever? Yes / No/ Unknown If yes, give month of onset____ ❖ Conjunctivities? Yes / No/ Unknown If yes, give month of onset____ ❖ Coryza? Yes / No/ Unknown If yes, give month of onset____ ❖ Cough? Yes / No/ Unknown If yes, give month of onset____ ❖ Maculopapular rash? Yes / No/ Unknown If yes, give month of onset____ ❖ Lymph nodes swallen? Yes / No/ Unknown If yes, give month of onset____ ❖ Arthralgia/arthritis Yes / No/ Unknown If yes, give month of onset____ **Exposed during pregnancy to anyone with maculopapular rash and fever?** Yes / No/ Unknown If yes, give month_____ **Travel during pregnancy?** Yes / No/ Unknown When and where_____
8	Laboratory confirmed	Yes (positive test result) Specify (IgM, PCR, virus isolation)_____ No Not tested
9	Final classification	○ Clinical (probable) – no laboratory test, but clinically consistent with CRS ○ Laboratory confirmed CRS – positive lab result with clinical manifestations ○ Congenital Rubella Infection – positive test result, but no clinical manifestation of CRS ○ Discarded – clinically inconsistent with CRS, negative lab result.

Responsible Person_____ Signature_____

(Name, position)

PROTOCOL FOR LABORATORY CONFORMATION OF RUBELLA

Sampling strategy: Collect specimens from every isolated probable/clinical CRS case (see case definition above). In case of a large outbreak, collect specimens from at least 5 cases from each cluster.

Confirmation test: Serological assay. Demonstration of rubella specific IgM antibody.

Specimen to be collected: Serum or plasma.

Referral laboratory: NCDC.

I. DOCUMENTATION

Supplies needed:

- ○ Register 60/A
- ○ Marker (water resistant)
- ○ Lab investigation request form
- ○ Specimen label

Steps:

1. Create a specimen label with patient's name, identification number, date, and time.
2. Fill in a copy of a lab investigation request form with patient information. (It will accompany specimen to the lab.)
3. Make sure patient information has been entered in register 60/A and an urgent notification has been sent to CPH.

II. COLLECTION AND HANDLING

Note: collect a single serum at the first contact with patient

Supplies needed:

- ○ Gloves
- ○ Pipette
- ○ Vacutainer tube with needle
- ○ Adhesive tape
- ○ Tourniquet
- ○ Band aid
- ○ Sterilizing swabs

Steps:

1. Collect 5 ml of blood (at least 3 ml from newborns) by venipuncture into a sterile tube (without anticoagulant) labeled with patient identification and collection date and time.
2. Allow blood to clot.
3. Centrifuge blood at 1000g for 10 minutes to separate the serum.

   * Blood can be stored at 4-8^{0}C for up to 24 hours before the serum is separated. Do not freeze whole blood. If there is no centrifuge, blood should be kept in refrigerator until there is complete retraction of the clot from the serum.
4. Carefully remove the serum with a pipette, avoiding extracting red cells, and transfer it aseptically into a sterile labeled vial.

   * If vaccutainer tubes containing a gel (yellow cap) are used, serum does not need to be separated after centrifugation manually. (The gel will provide this function.)
5. Make sure vial is properly labeled (see Section I).

III. STORAGE

- ▲ Whole blood may be held at 4-8^{0}C if it can be transported to arrive at the testing lab within 24 hours. In other cases it should be centrifuged (if there is no centrifuge see Section II).
- ▲ Store serum at 4-8^{0}C until it is ready for shipment for up to 7 days (Sera must be frozen at -20^{0}C for longer periods of storage; in this case, avoid repeated freezing and thawing).

IV. TRANSPORTATION

Supplies needed:

- ○ Ziplock plastic bag
- ○ Cold box with ice packs
- ○ Plastic container
- ○ Box label

Steps:

1. Tighten the cap, apply waterproof sealing tape over the cap and top of specimen container.
2. Place specimen container in a suitably sized plastic bag (1st layer) together with a small amount of absorbent material, such as cotton wool. The bag must be sealed either using heated bag sealer or waterproof adhesive tape; as an alternative, use ziplock plastic bags. Specimens from different patients should never be sealed in the same bag.
3. Sealed bags containing the specimens should be placed inside plastic containers with screw-cap lids (2nd layer). Provided that specimens have been double-bagged properly in sealed plastic bags, specimens from several patients may be packed inside the same secondary plastic container. Additional absorbent material should be placed inside the container to absorb any leakage that may occur.
4. Sealed plastic containers should be fitted into insulated 3rd layer containers (e.g., a cold box). First, place ice packs at the bottom of the box, and, along the sides, place the plastic container with the specimen in the center, then place more ice packs on top. Make sure that the container is firmly fixed in the outer box.
5. Put the lab investigation request form in a plastic bag and place it in the outer box.
6. Label box with name, address, and telephone number of the referral laboratory and the sender.
7. Label box with the safety precautions ("Do not freeze," "Do not expose to heat," "This side up," "Biological specimen," etc.).
8. Arrange shipping date.
9. When arrangements are finalized, inform the recipient of time and manner of transport and make sure that package reaches referral laboratory within 2–3 days of specimen collection.

V. COMMUNICATING TEST RESULTS

Laboratory should communicate results to the clinician within 2 days of receiving the sample. If the result of the test is positive, it should also notify the rayon CPH.

Steps:

1. Record the results in the case history and Journal 60/A.

10.3 Mumps

10.3.1 Rationale for Surveillance

Outbreaks of mumps can prevent a large number of people from attending school and work. Although severe complications are rare, mumps can cause acquired sensorineural hearing loss in children (incidence is estimated at 5 per 100,000 cases). Mumps-associated encephalitis occurs in <2 per 100,000 cases, with approximately 1 percent of encephalitis cases being fatal. Some complications of mumps are known to occur more frequently among adults than among children. Adults have a higher risk for mumps meningoencephalitis than children. In addition, orchitis occurs in up to 38 percent of cases in post-pubertal males. Although it is frequently bilateral, it rarely causes sterility. Mastitis has been reported in as many as 31 percent of female mumps patients older than 15 years. Other rare complications of mumps are oophoritis and pancreatitis.

The reported number of mumps cases in Georgia is between 2500 and 5000 annually (or 55-110 per 100,000 population). Routine immunization of children started in 2001; however, coverage achieved in 2001-2002 was very low (<20 percent) due to vaccine shortages. The Georgia National Health Policy envisions reduction of mumps incidence to <0.1 per 100,000 by 2006 by achieving 95 percent coverage of the eligible population with planned immunization and increased effectiveness of epidemiological surveillance to evaluate the prevention program effectiveness and identify high-risk areas and population groups to prevent potential outbreaks.

Strategies to achieve this goal include the following:

- Achieve and maintain high mumps immunization coverage among children according to the national immunization calendar (the target is 95 percent).
- Conduct supplemental campaigns with a mumps-containing vaccine periodically or during outbreak situations (without regard to vaccination history), providing a second opportunity for vaccination and "catching up" the cohort of susceptibles (since the mumps vaccine is not 100 percent effective). The target age group should be determined according to mumps susceptibility. (e.g., on a basis of epidemiological data).
- Establish effective surveillance for mumps to report regularly the number, age, and vaccination status of people contracting mumps, to thoroughly conduct outbreak investigations and to monitor immunization coverage.

10.3.2 Recommended Mumps Case Definition

Clinical description: Mumps is an illness that

- is identified by an acute onset of unilateral or bilateral tender, self-limited swelling of the parotid or other salivary gland **and**
- lasts more than two days without any other apparent cause.[11]

[11] Not all cases of parotitis, especially sporadic ones, are due to mumps infection. Parotitis can also be caused by obstruction of salivary duct, tumors, drugs, parainfluenza virus types 1 and 3, influenza A virus, Coxsakie A virus, and HIV. However, these agents do not produce parotitis on an epidemic scale.

Case classification

- ***Clinical (probable)****:* A case that meets the clinical description of mumps.
- ***Confirmed:***
  - ***By laboratory:*** A case that meets the clinical description of mumps and has
    - Isolation of mumps virus from an appropriate clinical specimen[12] *or*
    - Seroconversion or significant (at least fourfold) rise in serum mumps IgG titre[13] *or*
    - IgM specific antibodies[14].
  - ***Epidemiologically:*** A case that meets the clinical description of mumps and has an epidemiological link[14] to another laboratory-confirmed case.

Laboratory testing for mumps is currently not required.

10.3.3 Mumps Case Notification Procedures and Forms.

Follow the general requirements outlined in Chapter 4: any clinical (probable) mumps case identified by providers requires submission of an urgent notification to the CPH within 48 hours by any existing means of communication.

10.3.4 Mumps Case/Outbreak Investigation

Rapid identification of suspected clinical (probable) or confirmed cases of mumps is important in the initiation of control measures to prevent the spread of the disease among susceptible persons.

Note: Every clinical (probable) case requires an investigation by a rayon CPH epidemiologist in cooperation with facility health workers within one business day of notification.

The following steps should be undertaken in an investigation (refer to Chapter 6 on outbreak investigation for more detailed information):

a) Verify that all cases meet the clinical description of mumps by reviewing medical records.

b) Collect data as envisioned in the mumps outbreak investigation card (see Figure 20).

The collected data should be verified against the information found in the health facility's infectious disease register 60/A. It is entirely possible that the investigation will identify additional cases that have not been registered by the health facility.

c) Identify the source of infection and establish epidemiological links.

[12] Mumps virus can be isolated from throat swabs, urine and CSF.
[13] In the absence of mumps immunization in the preceding six weeks
[14] A close contact (household, school, etc.) with a clinical case 11 to 26 days prior to the onset of symptoms.

Check if mumps patients were in contact with a clinical (probable) or confirmed case 11-26 days prior to the onset of symptoms to determine the existence of an epidemiological link.

d) Assess potential for transmission and identify contacts.

The potential for transmission is usually determined by a number of susceptible contacts. Transmissions are particularly likely in schools and other institutions where the population is densely aggregated.

All contacts of the mumps case patients during their infectious period (2 days before and 9 days after the onset of parotitis) should be identified. Contacts over 9 months of age that have not documented evidence of receiving at least one dose of mumps-containing vaccine are considered susceptible.

e) Analyze the data about the outbreak as described in the general part of the guidelines.

The emphasis should be on identifying areas and population groups at highest risk.

f) Implement control and prevention measures (see next section).

g) Write a report and send it to the regional CPH in two copies (the regional CPH will forward one copy to NCDC).

The report should include

- The first part of the **Mumps Investigation Card** (see Figure 20) completed for each single case (number of cases in the card(s) should correspond to the number of cases indicated in the monthly report form)
- **Cluster Investigation Report**, which is prepared for group cases.

h) Inform local health administration and other stakeholders about outbreak/group cases verbally or in a written form.

10.3.5 Mumps Outbreak Control/Response

Mumps is the only known cause of epidemic parotitis. The main strategy for controlling a mumps outbreak is to define the at-risk population and a transmission setting, and then to rapidly identify and vaccinate susceptible persons, or, if a contraindication exists, to exclude susceptible persons from the setting to prevent exposure and transmission. The following control actions should be taken:

1. Isolate patients and exclude them from school or workplace for nine days from onset of swelling.
2. Disinfect articles soiled with nose or throat secretions of patients.
3. Consider excluding exposed people who lack acceptable evidence of immunity (documented vaccination or a history a physician-diagnosed mumps) from school or work place from the 12th through the 26th days after exposure if other susceptibles are present.
4. Identify contacts and vaccinate susceptible persons. While mumps vaccination may not prevent the disease in persons already exposed, they will be protected against infection from subsequent exposures. However, if susceptible persons are immunized early in the course of an outbreak, they might be protected.

10.3.6 Recommended Scope of Routine Analysis of Mumps Surveillance Data to Be Performed by CPH

(See Chapter 5 for more details.)

The CPH should perform routine monthly analysis of the following data:

- Mumps vaccine coverage (at 24 months) by year and subordinated area/setting
- Mumps incidence rate by month, year, and geographic area
- Mumps cases by age group and immunization status
- Completeness/timeliness of monthly reporting
- Mumps outbreak investigation rate

10.3.7 Principle Uses of Data for Decision Making at the Regional and Rayon Levels

The regional- and rayon-level CPHs will use the data primarily to accomplish the following:

- Monitor incidence and coverage to track progress toward goals, e.g., decreasing incidence and increasing coverage (target 95 percent)
- Identify and characterize population requiring additional disease control measures
- Evaluate and improve the performance of the surveillance system (e.g., reaction time for notification, case confirmation rate, outbreak investigation rate)

Figure 20. Mumps Investigation Card

# of facility and date Registration # in NCDC Region rayon

Part I monthlyIV-03 4/Mump

#	If inform. is additional indicate*	Patient #1	Patient #2	Patient #3	Patient #4
1.	Name				
2.	Address				
3.	Disease onset date	/ / / / Day month year	/ / / / Day month year	/ / / / Day month year	/ / / / Day month year
4.	Sex	Female Male	Female Male	Female Male	Female Male
5.	Date of birth	/ / / / Day month year	/ / / / Day month year	/ / / / Day month year	/ / / / Day month year
6.	No of received doses	_____ unknown	_____ unknown	_____ unknown	_____ unknown
7.	Date of last vaccination	/ / / / Day month year unknown	/ / / / Day month year unknown	/ / / / Day month year unknown	/ / / / Day month year unknown
8.	Date of notification to CPH	/ / / / Day month year	/ / / / Day month year	/ / / / Day month year	/ / / / Day month year
9.	Date of investigation	/ / / / Day month year	/ / / / Day month year	/ / / / Day month year	/ / / / Day month year
10.	Clinical description: (underline)	1) tender, self-limited swelling of the parotid or other salivary gland; 2) lasts more than two days	1) tender, self-limited swelling of the parotid or other salivary gland; 2) lasts more than two days	1) tender, self-limited swelling of the parotid or other salivary gland; 2) lasts more than two days	1) tender, self-limited swelling of the parotid or other salivary gland; 2) lasts more than two days
11.	Complications	Yes _____ No	Yes _____ No	Yes _____ No	Yes _____ No
12.	Hospitalization (indicate)	Yes _____ No	Yes _____ No	Yes _____ No	Yes _____ No
13.	Outcome	Died; Alive; Unknown	Died; Alive; Unknown	Died; Alive; Unknown	Died; Alive; Unknown
14.	Group case	Yes No unknown	Yes No unknown	Yes No unknown	Yes No unknown
15.	Final classification (underline one)	1)Discarded; 2) Clinical 3) Lab.confirmed; 4) Epid.confirmed	1)Discarded; 2) Clinical 3) Lab.confirmed; 4) Epid.confirmed	1)Discarded; 2) Clinical 3) Lab.confirmed; 4) Epid.confirmed	1)Discarded; 2) Clinical 3) Lab.confirmed; 4) Epid.confirmed

Responsible Person_____ (name, position)_____
Signature_____

The card should be completed for each case and submitted to the region CPH before day 5 and to NCDC (Tbilisi, 380077, st. M. Asatiani #9, Tel. 37-16-77.39-64-38) before day 7 of the next month.

*If the information represents additional data on the case already reported, please indicate this

Part II **(to be filled and kept at CPH)**					
	If not vaccinated indicate reasons				
16.	Contact with clinical case before 11-26 days of disease onset				

Response actions				
Isolation	○ yes till_____ (date) ○ case no longer infectious ○ no	○ yes till_____ (date) ○ case no longer infectious ○ no	○ yes till_____ (date) ○ case no longer infectious ○ no	○ yes till_____ (date) ○ case no longer infectious ○ no

List of susceptible contacts aged > 9 months

	name	age	address	measures taken: vaccination, isolation

Other outbreak control measures implemented:

1

2

3

Comments/Conclusions:

10.4 Tetanus and Neonatal Tetanus

10.4.1 Rationale for Surveillance

In spite of the availability of DPT and Td vaccines and recommendations to use tetanus toxoid and tetanus immune globulin as post-exposure prophylaxis in wound management, 4 to 6 cases of this disease continue to be reported in Georgia annually. In 2002, the number of registered cases increased to 13, which is very alarming. With the reported case fatality rate at over 50 to 60[15] percent in recent years, tetanus continues to be one of the leading causes of infectious disease mortality in Georgia.

Serologic studies demonstrated an excellent correlation between vaccination coverage and immunity to tetanus.

While most tetanus cases in Georgia occurred in nonimmunized adults, a growing number of cases in the age group 5-14 years reflect problems with routine immunization coverage of children. Because tetanus is a completely preventable disease, every case of tetanus should be considered a failure to vaccinate. Administration of post-exposure prophylaxis, timely diagnosis, and treatment of tetanus cases can significantly reduce the fatality rate. Every tetanus death should be considered a failure to diagnose and treat in a timely manner.

Note: Each case should therefore be used as a case study to determine which factors contributed to the failure and which measures could be taken to prevent such cases in the future.

Information obtained through surveillance can help to characterize population groups or geographic areas in which additional efforts are needed to raise vaccination levels and reduce disease incidence and case fatality. It can be also used to raise awareness of the importance of adult immunization.

Strategies to combat tetanus include the following:

1. Achieve and maintain high (>90 percent) DPT and DT coverage in children, and provide Td booster to all persons > 14 years of age every 10 years.

2. Identify the population groups or geographic areas where tetanus cases are occurring and offer a Td immunization or booster to all adults without documental evidence of immunization.

3. Ensure that emergency reserves of tetanus antitoxin, immune globulin, and toxoid are available in each rayon and can be promptly mobilized for treatment or post-exposure prophylaxis in facilities should the need arise.

4. Establish effective surveillance for tetanus to report detailed case-based information, thoroughly investigate every tetanus case and death, and monitor immunization coverage with tetanus-containing toxoids (vaccines).

[15] Tetanus case fatality rate worldwide is 2 to 18 percent. Higher tetanus case fatality in Georgia is most likely indicative of under-reporting of nonfatal cases.

10.4.2 Recommended Case Definition

Clinical description: Any person with acute onset of hypertonia and/or painful muscular contractions (usually of the muscles of the jaw and neck) and generalized muscle spasms without other apparent cause.

A clinical description of neonatal tetanus is as follows: Any neonate with a normal ability to suck and cry during the first two days of life, and who between 3 and 28 days of age cannot suck normally, and becomes stiff or has convulsions or both.

Case classification

- ***Clinical (probable)****:* A case that meets the clinical description of tetanus or neonatal tetanus
- ***Confirmed:*** not applicable

10.4.3 Tetanus and Neonatal Tetanus Case Notification Procedures and Forms

Follow the general requirements outlined in Chapter 4: any clinical (probable) tetanus case identified by providers requires submission of an urgent notification to CPH within 24 hours by any existing means of communication.

Prompt notification may save a patient's life because this will facilitate:

- receiving faster hospitalization (nasotracheal intubation and mechanically assisted respiration are often required),
- receiving faster administration of tetanus immunoglobulin or antitoxin, and
- obtaining timely expert consultations on clinical management issues

10.4.4 Tetanus and Neonatal Tetanus Case Investigation

A single case of tetanus requires an investigation by a rayon CPH epidemiologist in cooperation with facility health workers within 3 business days of notification. Should there be a case of neonatal tetanus, the investigation should be performed within 2 business days and will be led by NCDC and/or regional CPH experts. The following steps should be undertaken in an investigation:

a) Verify that the case meets the clinical description of tetanus by reviewing medical records

b) Collect case-based data as envisioned in the standard tetanus investigation card (see Figure 21)

c) Analyze the case-based data and immunization coverage[16] with tetanus-containing vaccines

[16] Tetanus coverage should be analyzed routinely (monthly) by CPH. Due to there being a small number of cases, other tetanus surveillance indicators will be analyzed at the national level.

Identify all reasons that have or may have contributed to a fatal outcome:

- Failure to immunize
- Vaccine failure
- Patient sought care too
- Medicines not
- Unacceptable delay of specific treatment after first medical
- Inappropriate post-exposure prophylaxis
- Inappropriate case treatment
- Failure to ensure aseptic conditions during delivery

d) Implement measures to prevent future cases

- Intensify routine immunization of children with DPT and DT to reach at least 90 percent coverage
- Write a case study and distribute to all practitioners in the country to promote their awareness.
- Intensify health education of population
- Create a reserve of essential medicines for tetanus management
- Enforce adherence to case management standards and enhance provider education
- Conduct a Td booster campaign for adults (appropriate territory and/or population groups to be defined in consultation with NCDC based on epidemiological and serological survey data).
- Evaluate reliability of cold chain for vaccine storage and transportation

e) Complete the tetanus investigation card and send it to regional CPH in two copies (the CPH will forward one copy to NCDC). The number of cards should correspond to the number of cases indicated in the monthly report form.

Figure 21. Tetanus Investigation Card

# of facility and date Registration # in NCDC autonomous rep; region rayon monthly IV-03 5/T

1	Full name of patient	
2	Date of birth	Day/ / Month/ / Year / /
3	Address	
4	Occupation	
5	Tetanus toxoid history prior to the disease	Include doses of ALL tetanus-containing toxoids. Exclude doses received after this particular injury. ○ Never ○ 1 dose ○ 2 doses ○ 3 doses ○ 4 doses ○ 5+ doses ○ Unknown Interval since last tetanus toxoid dose_____(years)
6	Circumstances of antecedent injury	Date occurred/ / Month/ /Year/ /Describe the incident_____ Anatomic site Contaminated (dirt, soil, etc)? Y/N Work related? Y/N Signs of infection? Y/N If no acute injury, identify and describe associate condition (e.g., diabetic ulcer)_____
7	Prophylactic care Prior to disease onset	Did the patient seek medical care for this injury? Y/N If yes, was TETANUS TOXOID administered after injury but before disease onset? Yes Not offered Not available If yes, how soon after injury? ○ Within 24hrs ○ 1-4days ○ More than 5 days Was TETANUS IMMUNOGLOBULIN prophylaxis given before tetanus onset? Yes Not offered Not available If yes, how soon after injury? ○ Within 24hrs ○ 1-4days ○ More than 5 days Was WOUND DEBRIDED before tetanus onset? Yes No If yes, how soon after injury? ○ Within 24hrs ○ 1-4days ○ More than 5 days
8	Course and treatment of tetanus disease	Disease onset Date/ /Month / /Year / / First contact with health system Date/ /Month / /Year / / Hospitalized? Date/ /Month / /Year / /Place of hospitalization_____ Tetanus IMMUNOGLOBULIN or ANTITOXIN therapy given? Yes Not offered Not available Patient refused Initial dose_____ Total dosage_____ How soon after the first contact with health system? ○ Within 24hrs ○ 1-4days ○ More than 5 days
9	In case of death	Day / /month / /year/ /Reason:_____ Possible contributing factors (check all that apply): ○ Not adequately immunized ○ Vaccination did not protect ○ Did not seek preventive care ○ Absence of TT for prophylaxis ○ Prophylaxis not given ○ Patient sought treatment too late ○ Treatment delayed after 1st consultation ○ Absence of tetanus antitoxin or immune globuline ○ Treatment not offered ○ Patient refused treatment ○Delivery in non-aseptic conditions ○Other (specify) _____
10	**Neonatal patients** (less than 28 days old)	**Mother's tetanus toxoid history** prior to child's disease (known doses only) ○ None ○ 1 dose ○ 2 doses ○ 3 doses ○ 4 doses ○ 5+ doses ○ Unknown Interval since last tetanus toxoid dose_____(years) **Patient born in** ○ Hospital ○ Home ○ Other (specify)_____ **Birth attended by** ○ Physician ○ Nurse/midwife ○ Other (specify)_____

Responsible Person_____ Signature_____

(Name, position)

The card should be submitted to the region CPH before day 5 and to NCDC (Tbilisi, 380077, st. M. Asatiani #9, Tel. 37-16-77.39-64-38) before day 7 of the next month for each case.

10.5 Pertussis

10.5.1 Rationale for Surveillance

Pertussis is a major cause of childhood morbidity. The number of reported cases in Georgia is 80 to 300 annually (1.8-6.0 per 100,000 population). However, this disease is believed to be underreported in Georgia, because pertussis is often overlooked in the differential diagnosis of cough illness.

Pertussis-related deaths (none reported in Georgia in recent years) are mostly caused by secondary bacterial pneumonia. Other complications are rare, but may include neurological complications such as seizures and encephalopathy, otitis media, and conditions resulting from the pressure effects of severe paroxysmal coughing, such as pneumothorax, epistaxis, subdural hematomas, hernias and rectal prolapse. The risk of serious complications is the highest among young children, particularly those under one year of age.

Information obtained through surveillance of this disease should be used to do the following:

- Monitor the impact of routine immunization program and identify persons or areas in which additional efforts are required to reduce disease incidence
- Promptly identify outbreaks in which vaccination of non- and under-immunized children and anti-microbial prophylaxis of contacts can help limit the spread of the disease
- Monitor the effectiveness of outbreak control strategies.

The Georgia National Health Policy envisions reduction of pertussis incidence to < 0.1 per 100,000 by 2006 through the following ***strategies***:

- Achieve more than 90 percent coverage of the eligible population with planned immunization and addressing excessively administered contraindications (the target is 95 percent coverage). The priority is to ensure that infants are completely immunized with a primary series of three doses of DPT vaccine at the youngest age possible (4 months of age).
- Establish effective surveillance for pertussis to report regularly the number, age, and vaccination status of children contracting pertussis, to thoroughly conduct outbreak investigations with proper case and contact management, and to monitor immunization coverage.
- Improve laboratory confirmation of pertussis, particularly standardization of specimen collection, transport, and processing.

10.5.2 Recommended Pertussis Case Definition

Clinical description: Pertussis is evident in a person that has ***a cough lasting at least two weeks*** **and** at least one of the following:

- paroxysms of coughing, or
- inspiratory “whooping” and

- vomiting immediately after cough without other apparent cause.

Case classification

- ***Clinical (probable)****:* A case that meets the clinical description of pertussis
- ***Confirmed***: A case that meets the clinical description of pertussis and has at least one of the following criteria:
  - ***Laboratory-confirmed:***
    - Isolation of *B. pertussis* from a clinical specimen or
    - Positive polymerase chain (PCR) reaction assay for *B. pertussis*
    - Positive paired serology
  - ***Epidemiologically confirmed:*** an epidemiological link to a lab-confirmed case.

Epidemiological link is a close contact with another confirmed cases 2-15 days prior to onset of symptoms.

Laboratory testing is currently mandated for confirmation of outbreaks when there is a clustering of 3 or more clinical (probable) cases. Samples can be analyzed at NCDC.

10.5.3 Pertussis Case Notification Procedures and Forms

Any clinical case of pertussis identified by providers or a positive pertussis lab test requires urgent notification of the CPH within 24 hours by any existing means of communication. General requirements are outlined in more detail in Chapter 4.

10.5.4 Pertussis Case/Outbreak Investigation

Anti-microbial treatment of promptly identified cases may lessen the severity of symptoms and may limit the period of communicability. In addition, prompt identification of cases will facilitate early identification of un- or under-vaccinated children among contacts. These children, if reached quickly, may be protected with vaccination. Anti-microbial prophylaxis of household and other close contacts may prevent secondary cases. Because pertussis can be very severe among young infants, early anti-microbial prophylaxis is particularly important in this age group.

Note: Every single reported pertussis case has to be investigated by a rayon CPH epidemiologist in cooperation with NCDC and regional CPH experts and facility health workers within 1 business day of notification.

The following steps are required in an investigation:

a) Verify that all cases meet the clinical description of pertussis by reviewing medical records.

b) Collect data as envisioned in the pertussis investigation card (see Figure 22).

The collected data should be verified against the information found in the health facility's infectious disease register 60/A.

c) Identify the source of infection and establish epidemiological links.

Check if pertussis patients were in close contact with a laboratory-confirmed case 2-15 days prior to onset of symptoms to determine the existence of an epidemiological link.

d) Collect specimens if the outbreak involves three or more pertussis cases from all of the patients.

The standard and preferred laboratory test for diagnosis of pertussis is isolation of *B. pertussis* by bacterial culture. The timing of specimen collection can affect the isolation rate, as can inadequately collected specimens. Isolation of the organism is most successful during the catarrhal stage (i.e., first 1-2 weeks of cough), prior to administration of antibiotics.

e) Assess potential for transmission and identify contacts.

The potential for transmission is usually determined by the number of susceptible contacts. Pertussis is transmitted by direct contact with discharges from respiratory mucous membranes of infected persons by the airborne route. Transmission is particularly likely at home (the disease can be brought in by a sibling) or among other close contacts.

- Identify all close contacts of the pertussis patients during their infectious period (from the early catarrhal stage to three weeks after onset of typical paroxysms; or if treated with antibiotics, the period of infectiousness usually stops five days after onset of therapy). ***Close contacts are*** household members and people who had direct contact with respiratory secretions from the case, (e.g., an explosive cough or sneeze in the face, sharing food or eating utensils, kissing or conducting a medical examination).

- Antibodies acquired passively through placenta rapidly fall during the first months of life. All close contacts over 4 months of age without documented evidence of receiving at least three DPT doses are therefore considered susceptible.

f) Implement control and prevention measures (see next section).

g) Write a report and send it to the regional CPH in two copies (the region CPH will forward one copy to NCDC). The report should include

  - The first part of the **Pertussis Investigation Card** (see Figure 22) completed for each single case (number of the cases in the card(s) should correspond to the number of cases indicated in the monthly report form)
  - **Cluster Investigation Report**, which is prepared for group cases

h) Inform local health administration and other stakeholders about outbreak/group cases verbally or in a written form.

10.5.5 Pertussis Outbreak Control/Response

A single pertussis case in Georgia is considered an outbreak and requires the following control actions from the health facility and rayon CPH:

- Respiratory isolation should be enforced for known cases. Exclude contact with young children and infants, especially non-immunized infants, until the patient has received at least 5 days of a minimum 14-day course of antibiotics. Cases that do not receive antibiotics should be isolated for 3 weeks.

- Discharges from nose and throat and articles soiled by these cases should be disinfected.
- Inadequately immunized household contacts under 7 years of age should be excluded from schools, day care centers, and public gatherings for 21 days after last exposure or until the cases and contacts have received 5 days of appropriate antibiotics.
- ***Protection of close contacts*** to prevent or minimize transmission (household members and people who had direct contact with respiratory secretions from the case, e.g., an explosive cough or sneeze in the face, sharing food or eating utensils, kissing or conducting a medical examination)
    - Administer antibiotic prophylaxis for 14 days regardless of age and vaccination status. Initiating chemo-prophylaxis more than 3 weeks after exposure has limited benefit for the contacts.
    - All close contacts under 7 years of age who have not received four doses of DPT should complete the series with minimal intervals (30 days between doses 1-2 and 2-3, and 6 months between the third and fourth dose). Close contacts under seven years of age that have received 4 doses of DPT, but have not received a dose within 3 years of exposure should be given a booster dose of DPT.

Pertussis vaccine is not given to persons 7 years of age or older, since reactions to the vaccine may be increased in older children and adults.

10.5.6 Recommended Scope of Routine Analysis of Pertussis Surveillance Data to Be Performed by CPH

(See Chapter 5 for more details.)

The CPH should perform routine monthly analysis of the following data:

- DPT-3 (at 12 months) and DPT-4 (at 24 months) coverage by year and subordinated area/setting
- Incidence rate by month, year, and geographic area
- Pertussis cases by age group and immunization status
- Case “confirmation” and laboratory confirmation rates for the territory
- Completeness/timeliness of monthly reporting
- Pertussis case/outbreak investigation rate.

Figure 22. Pertussis Investigation Card

# of facility and date Registration # in NCDC Region rayon

Part I monthlyIV-03 6/Per

#	If inform. is additional indicate*	Patient #1	Patient #2	Patient #3	Patient #4
1.	Name				
2.	Address				
3.	Disease onset date	/ / / / Day month year	/ / / / Day month year	/ / / / Day month year	/ / / / Day month year
4.	Sex	Female Male	Female Male	Female Male	Female Male
5.	Date of birth	/ / / / Day month year	/ / / / Day month year	/ / / / Day month year	/ / / / Day month year
6.	No of received doses	_____ unknown	_____ unknown	_____ unknown	_____ unknown
7.	Date of last vaccination	/ / / / Day month year unknown	/ / / / Day month year unknown	/ / / / Day month year unknown	/ / / / Day month year unknown
8.	Date of notification to CPH	/ / / / Day month year	/ / / / Day month year	/ / / / Day month year	/ / / / Day month year
9.	Date of investigation	/ / / / Day month year	/ / / / Day month year	/ / / / Day month year	/ / / / Day month year
10.	Clinical description: (underline)	Cough; paroxysms; inspiratory whooping; vomiting immediately after cough; unknown	Cough; paroxysms; inspiratory whooping; vomiting immediately after cough; unknown	Cough; paroxysms; inspiratory whooping; vomiting immediately after cough; unknown	Cough; paroxysms; inspiratory whooping; vomiting immediately after cough; unknown
11.	Antibiotic therapy	Yes No	Yes No	Yes No	Yes No
12.	Complications	Yes _____ No	Yes _____ No	Yes _____ No	Yes _____ No
13.	Hospitalization (indicate)	Yes _____ No	Yes _____ No	Yes _____ No	Yes _____ No
14.	Outcome	Dies; Alive Unknown	Dies; Alive Unknown	Dies; Alive Unknown	Dies; Alive Unknown
15.	Group case	Yes No unknown	Yes No unknown	Yes No unknown	Yes No unknown
16.	Final classification (underline one)	1)Discarded; 2) Clinical 3) Lab.confirmed; 4) Epid.confirmed	1)Discarded; 2) Clinical 3) Lab.confirmed; 4) Epid.confirmed	1)Discarded; 2) Clinical 3) Lab.confirmed; 4) Epid.confirmed	1)Discarded; 2) Clinical 3) Lab.confirmed; 4) Epid.confirmed
17.	Date of specimen collection?	/ / / / Day month year	/ / / / Day month year	/ / / / Day month year	/ / / / Day month year
18.	Date of lab result?	/ / / / Day month year	/ / / / Day month year	/ / / / Day month year	/ / / / Day month year

*If the information represents additional data on the case already reported, please indicate this

Responsible Person_____ (name, position)_____
Signature_____

The card should be completed for each case and submitted to the region CPH before day 5 and to NCDC (Tbilisi, 380077, st. M. Asatiani #9, Tel. 37-16-77.39-64-38) before day 7 of the next month.

Part II (to be filled and kept at CPH)					
19.	If <3 doses for ≥ 4 months old child, indicate reasons				
20.	Indicate start and end date of antibiotictherapy if performed	/ / / / Day month year / / / /	/ / / / Day month year / / / /	/ / / / Day month year / / / /	/ / / / Day month year / / / /
21.	Source of Infection. If known, indicate	unknown; known:			
Response actions					
isolation		○ yes till_____ (date) ○ is not contagious ○ no	○ yes till_____ (date) ○ is not contagious ○ no	○ yes till_____ (date) ○ is not contagious ○ no	○ yes till_____ (date) ○ is not contagious ○ no

> 9 months susceptible contacts

	name	age	address	measures taken: vaccination, isolation

Other outbreak control measures implemented:

1

2

3

4.

Comments/Conclusions:

Responsible person _____ _____(name, position)

10.5.7 Principle Uses of Data for Decision Making at the Regional and Rayon Levels

The regional- and rayon-level CPHs will use the data primarily to accomplish the following:

- Monitor incidence and coverage to track progress toward goals, e.g., decreasing incidence and increasing coverage (target 95 percent), and to identify areas of high risk or with poor program performance.
- Promptly identify outbreaks in which vaccination of non- and under-immunized children and anti-microbial prophylaxis of contacts can help limit the spread of the disease.
- Determine why the outbreak occurred. The three major reasons are
  - failure to vaccinate (low routine coverage),
  - vaccine failure (low protective efficacy of vaccine), and
  - accumulation of susceptibles (unvaccinated people and vaccine failures)

Corrective measures will depend on the primary reason for the outbreak.

- Monitor the effectiveness of outbreak control strategies.
- Describe the changing epidemiology of pertussis reflected in increased incidence among adults. Raise awareness of physicians, as pertussis is often overlooked in the differential diagnosis of cough illness in adults.
- Evaluate and improve the performance of the surveillance system (e.g., reaction time for notification, specimen collection).

PROTOCOL FOR LABORATORY CONFORMATION OF PERTUSSIS

Sampling strategy: If your facility has registered 3 or more pertussis cases during the past 30 days, collect specimens from the last patient and two more pertussis patients. Collect specimens at any time on request of CPH.

Confirmation test: Isolation of *B. pertussis* by bacterial culture

Specimen to be collected: Naso-pharyngeal swab or aspirate

Referral laboratory: NCDC. Focal person: Tsaro Gomeluri Phone 39 89 46 / 39 64 38

I. DOCUMENTATION

Supplies needed:

- ○ Journal 60/A
- ○ Marker (water resistant)
- ○ Lab investigation request form
- ○ Specimen label

Steps:

1. Create a specimen label with patient's name, identification number, date, and time.
2. Fill in a copy of a lab investigation request form with patient information. (It will accompany specimen to the lab.)
3. Make sure patient information has been entered in Journal 60/A and an urgent notification has been sent to CPH.

II. COLLECTION AND HANDLING

Note: Collect two specimens (at the same time) preferably during the first 1-2 weeks of cough and before administration of antibiotics

Supplies needed:

- ○ Dacron or calcium alginate swabs (avoid rayon or cotton swabs, because they contain acids toxic to B. pertussis)
- ○ Sterile saline solution
- ○ Regan-Lowe transport medium **or**
- ○ Regan-Lowe agar or Bordet-Gangou media

Steps:

Naso-pharyngeal specimens are obtained under direct light using over-the-shoulder illumination using the aseptic technique to prevent contamination by other micro-organisms.

1. Gently elevate the nose with the thumb of one hand.
2. Moisten the tip of a small flexible wire naso-pharyngeal swab with sterile water or saline and gently insert it into one of the nostrils.
3. Guide the swab backward and upward along the nasal septum until a distinct feel of resistance indicates that the posterior pharynx has been reached.
4. Gently remove the swab.

   If while guiding the swab undue resistance is met, attempt the procedure through the opposite nostril. (Pay attention if a tear drop appears – you are in the right place!)
5. Plate the specimen directly onto selective culture medium (Regan-Lowe agar or Bordet-Gengou medium) or place it in transport medium (half-strength Regan-Lowe).

   Note: If these media are unavailable place the swab in a sterile container and send promptly to the lab. In this case, the specimen should arrive at the laboratory within 2 hours.
6. Make sure the medium is properly labeled (see Section I).

IV. TRANSPORTATION

Supplies needed:

- ○ Ziplock plastic bag
- ○ Shipping box/container
- ○ Plastic container
- ○ Box label

Steps:

1. Tighten the cap, apply waterproof sealing tape over the cap and top of specimen container.
2. Place specimen container in a suitably sized plastic bag (1st layer) together with a small amount of absorbent material, such as cotton wool. The bag must be sealed either using heated bag sealer or waterproof adhesive tape; as an alternative, use ziplock plastic bags. Specimens from different patients should never be sealed in the same bag.
3. Sealed bags containing the specimens should be placed inside plastic containers with screw-cap lids (2nd layer). Provided that specimens have been double-bagged properly in sealed plastic bags, specimens from several patients may be packed inside the same secondary plastic container. Additional absorbent material should be placed inside the container to absorb any leakage that may occur.
4. Sealed plastic containers should be fitted into insulated 3rd layer containers – outer shipping container.
5. Put the lab investigation request form in a plastic bag and place it in the outer box.
6. Label box with name, address, and telephone number of the referral laboratory and the sender.
7. Label box with the safety precautions ("Do not freeze," "Do not expose to heat," "This side up," "Biological specimen," etc.).
8. Arrange shipping date.
9. When arrangements are finalized, inform the recipient of time and manner of transport and make sure that package reaches referral laboratory within 24 hours of specimen collection.

III. STORAGE	V. COMMUNICATING TEST RESULTS
Steps: 1. Specimen inoculated on the transport media can be stored at room temperature (25^0C) for up to 24 hours until shipment. 2. If transportation is delayed, the specimen with the help of an epidemiologist should be inoculated on the Bordet-Gangou media and placed in a thermostat at 37^0C (max 3-4 days). 3. In other cases the specimen should be decontaminated. If the facility is not able to decontaminate, the specimen should be sent to the laboratory for this purpose.	1. Laboratory should communicate results to the clinician within 2 days of receiving the sample. If the result of the test is positive, it should also notify the rayon CPH. **Steps:** 1. Record the results in the case history and in Journal 60/A

10.6 Acute Viral Hepatitis B (with case definitions for acute viral hepatitis A-E)

10.6.1 Rationale for Surveillance

Hepatitis B virus (HBV) infection is one of the major causes of infectious disease morbidity and mortality in Georgia. Based on the seroprevalence of HBsAg in the population (approximately 3 percent overall, and as high as 20 to 40 percent in certain population groups such as intravenous drug users and health workers), Georgia is considered to be a country with intermediate Hepatitis B endemicity.

Approximately 450 to 600 cases of the clinically manifested acute HBV infection are reported annually (10-13 per 100,000). However, with the sharp reduction in hospital utilization by the population in recent years it is reasonable to assume underreporting of clinically manifested hepatitis B. More than half of acute HBV infections are asymptomatic and are rarely diagnosed and reported. Clinical forms of acute hepatitis B are often associated with a long period of disability and have fatal outcomes in 1 to 2 percent of cases.

A variable proportion of persons with acute HBV infection develop chronic infection. Chronic HBV infection is defined as the presence of HBsAg in serum for at least 6 months, or the presence of HBsAg with a negative test for IgM anti-HBc. The risk of developing chronic infection is age-dependent. It is greatest for infants (90 percent), if they are infected at birth (perinatal transmission). Overall 30 to 50 percent of children and 3 to 6 percent of adults with acute infection will develop chronic infections. Persons with chronic HBV infection are at increased risk of developing liver cirrhosis or primary liver carcinoma. It is estimated that at least 600 people die each year due to HBV-induced chronic liver disease in Georgia. In addition, persons with chronic HBV infection are a major reservoir for transmission of HBV infections to others.

Information obtained through hepatitis B surveillance can be used to perform the following:

- Identify infected persons who need counseling to protect their liver from further harm and referral for medical management
- Identify contacts of cases who require post-exposure prophylaxis
- Detect outbreaks
- Monitor disease incidence in all age groups
- Determine the epidemiologic characteristics of infected persons, including the source of their infection, to assess and reduce the missed opportunities for vaccination.

The Georgia National Health Policy envisions reduction of the current hepatitis B incidence by 80 percent by 2009 through the following ***strategies***:

1. Achieve greater than 90 percent coverage of infants with routine immunization (target 95 percent). A first dose should be given to infants as soon as possible after birth (preferably within 24 hours) to prevent HBV transmission from mother to infant. Perinatal transmission almost always results in a chronic infection.

2. Conduct catch-up vaccination of older persons ***in addition*** to routine infant vaccination (this

should not hinder efforts to achieve a high level of completion of the vaccination series among infants). Possible target groups could include young adolescents and persons with risk factors for acquiring HBV infection such as long-term haemodialysis patients, health personnel, intravenous drug users, commercial sex workers, residents of mental institutions, and so forth. The success of this strategy may vary, because persons in these groups usually initiate high-risk behaviors before they get vaccinated.

3. Maintain strict adherence to the post-exposure and perinatal exposure recommendations (described below).

4. Improve safety of medical manipulations including safe utilization of sharps, barrier protective measures, and thorough testing of blood and blood products.

5. Enhance public education about individual protection against blood-borne infections and sexually transmitted diseases (STDs).

10.6.2 Recommended Acute Viral Hepatitis Case Definitions

Clinical description: Any person that has an acute illness, typically including acute jaundice, dark urine, anorexia, malaise, fatigue, and right upper quadrant tenderness. Biological signs include increased urine urobilinogen and usually >2.5 times the upper limit of serum alanine aminotransferase (ALT).

Note: The proportion of asymptomatic infections is variable.

Case classification

- **Clinical (probable)** (unspecified acute viral hepatitis): A case that meets the clinical description above.
- **Confirmed**: A case that has at least one of the following.

For hepatitis B:

- IgM antibody to hepatitis B core antigen (anti-HBc) positive[17]

For hepatitis A:

- IgM antibody to hepatitis A antigen (anti-HAV) positive or
- A case compatible with the clinical description in a person who has an epidemiological link (a close contact with a lab-confirmed case during his/her period of communicability 15 to 50 days prior to the onset of symptoms) with a confirmed hepatitis A case.

For patients negative for hepatitis A or B, further testing for a diagnosis of acute hepatitis C, D, or E is recommended.

[17] The anti-HBc IgM test is specific for acute infection. HBsAg is less desirable since cannot distinguish acute new infections from exacerbation of chronic hepatitis B. Continued seropositivity (>six months) is an indicator of chronic infection.

For hepatitis C:

- IgM antibody to hepatitis C antigen (anti-HCV) positive

For hepatitis D: (only as co-infection or super-infection of hepatitis B)

- Anti-HDV positive and HBsAg positive
- Anti-HDV positive and IgM anti-HBc positive

For hepatitis E:

IgM antibody to hepatitis E antigen (IgM anti-HEV) positive

Because the clinical picture for all acute viral hepatitis A through E is similar, only laboratory testing can reliably distinguish various etiological agents. Testing for as many markers as possible is therefore very important, because response measures depend on the type of hepatitis identified.

Anti-HBs is present in persons who have resolved from the HBV infection or those who have developed immunity after vaccination. anti-HBc is not present after vaccination.

Laboratory testing is currently mandated for every clinical (probable) case of acute viral hepatitis (except for an outbreak of hepatitis A, where it is required to confirm at least one case, provided that all cases are epidemiologically linked or every case where such link cannot be established). The regional CPH can be contacted to obtain the most current list of NCDC recognized/recommended laboratories in the area.

10.6.3 Case Notification Procedures and Forms

Any clinical (probable) case of acute viral hepatitis identified by providers or a positive lab test for any hepatitis requiring urgent notification of the CPH within 24 hours by any existing means of communication. General requirements are outlined in more detail in Chapter 4.

10.6.4 Hepatitis B Case/Outbreak Investigation

Although outbreaks of hepatitis B are rare, rapid identification and investigation of cases of acute hepatitis B is important because the source could be identified and measures can be taken to prevent further transmission to other persons (e.g., post-exposure prophylaxis). In addition, identification of risk factors for infection provides a means to assess the effectiveness of hepatitis B immunization activities in the community and identify missed opportunities for immunization.

Note: A confirmed acute hepatitis B case requires an investigation by a rayon CPH epidemiologist in cooperation with facility health workers within 3 business days of notification.

The following steps are recommended in an investigation (see also Chapter 6):

a) Verify that all hepatitis B cases are laboratory confirmed by reviewing medical records.

Collect serum specimens to confirm the evidence of acute liver disease (elevated aminotransferase levels) and determine its type if this has not been done previously.

b) Collect data as envisioned in the acute hepatitis B outbreak investigation card (see Figure 23).

The collected data should be verified against the information found in health facility's infectious disease register 60/A.

c) Identify the source of infection. Verify the following with respect to every patient:

- Was he/she in contact with an acute or chronic hepatitis case?

  Sexual ○ Household ○ Other ○ _____

- Did the person have dental work or surgery?
- Did the person have another type of surgery?
- Did the person have medical injections or vaccinations with nondisposable (i.e., used on multiple occasions) needles or syringes?
- Did the person have invasive diagnostic or endoscopic procedures?
- Did the person use needles for injection of drugs?
- Did the person have an accidental stick or puncture with a needle or other object contaminated with blood?
- Did the person have acupuncture? Tattooing? Ear piercing?
- Was the person employed in a medical, dental, or other field involving contact with human blood?
- Did the person receive blood or blood products? Specify dates_____
- Did the person have multiple sexual partners?
- Was the person associated with a dialysis or kidney transplant unit?

d) Conduct a search for additional cases if two or more cases occur in association with common exposure.

e) Investigate safety of (medical) manipulations and practices by the potential source of infection, such as the following:

- Adequacy of sterilization
- Safe utilization of sharps and medical waste
- Implementation of barrier methods for protection
- Sensitivity of tests used for screening of donated blood for HbsAg

f) Identify and prepare a list of contacts for post-exposure prophylaxis (e.g., sexual, household, persons with suspected blood exposure).

g) Implement control and prevention measures (see next section).

h) In case of outbreaks write a report and send to regional CPH in two copies (the region CPH will forward one copy to NCDC). The report should include:

- The first part of the **Hepatitis B Investigation Card** (see Figure 23) filled for each single case (number of cases in the card(s) should correspond to the number of cases indicated in the monthly report form)
- **Cluster Investigation Report**, which is prepared for group cases

h) Inform local health administration and other stakeholders about outbreak verbally or in a written form.

10.6.5 Outbreak Control/Response

An outbreak of viral hepatitis requires the following control actions from the health facility and rayon CPH:

1. If the source of infection is identified, implement measures to stop further transmission by addressing the reason; for example:
   - Institute strict aseptic standards, adequate sterilization and safe medical waste disposal in the health facility
   - Withdraw the infected lot of a blood/plasma derivative from use
   - Test all donated blood by a more sensitive test
   - Impose stricter donor selection standards (e.g., only people without a history of viral hepatitis and injecting drug use who have not been received a blood transfusion or tattoo in the past 6 months); and,
   - Enforce aseptic sanitary practices in the tattoo parlor.
2. Ensure that post-exposure and perinatal prophylaxis are carried out.

Post-exposure prophylaxis

a. Susceptible[18] sexual contacts and persons with suspected blood exposure (e.g., sharing razors) to the index case should be given Hepatitis B Immunoglobulin (5 ml) and begin hepatitis B vaccine on a 0, 1-, and 6-month schedule preferably within 48 hours (maximum 14 days) of the exposure/last sexual contact. Immunoglobulin and vaccine should be administered into different anatomic sites.

b. After percutaneous (e.g., needle stick) or mucous membrane exposures to blood that might contain HBsAg, a decision to provide post-exposure prophylaxis must include consideration of several factors:
   - Whether information on the source of blood is available
   - HBsAg status of the source
   - Hepatitis B status of the exposed person.

c. Immunization of all other household contacts of a person with acute of chronic infection, particularly children and adolescents, is strongly encouraged.

[18] Testing for susceptibility may be considered if it does not delay the above measures. Persons are not susceptible to HBV infection if they are positive for anti-HBc, which are indicative of acute, resolved, or chronic infection.

d. If the index case is a mother or caretaker of a child <12 months of age, this infant should be given Hepatitis B Immunoglobulin (0.5ml) and also vaccinated. Immunoglobulin is not needed for infants who already received at least 2 doses of the vaccine.

Perinatal exposure prophylaxis

Infants born to HbsAg-positive women should receive immunoprophylaxis with Hepatitis B Immunoglobulin (0.5–1ml) and hepatitis B vaccine within 12 hours of birth. Follow-up doses of vaccine should be given according to the immunization schedule (at 2 and 4 months of age). Immunoglobulin and vaccine should be administered into different anatomic sites.

10.6.6 Recommended Scope of Routine Analysis of Hepatitis B Surveillance Data to Be Performed by CPH

(See Chapter 5 for more details.)

The CPH should perform routine monthly analysis of the following data:

1. Hepatitis B-3 (at 12 months) coverage by subordinated area/setting
2. Incidence rate by month, year, and geographic area
3. Hepatitis B cases by age group and immunization status
4. Case/laboratory confirmation rates for the territory
5. Completeness/timeliness of monthly reporting
6. Acute hepatitis B outbreak investigation rate

10.6.7 Principle Uses of Data for Decision Making at the Regional and Rayon Levels

The regional- and rayon-level CPHs will use the data primarily to accomplish the following:

- Monitor Hepatitis B-3 coverage by geographic area to identify areas with weak program performance where action needs to be taken to correct the situation.
- Promptly identify outbreaks and investigate why they occurred. Implement respective measures to stop further transmission and monitor the effectiveness of control strategies.
- Understand the epidemiology of hepatitis B in terms of distribution over time, by age group/occupation and by geographical area, typical causes and choose proper strategies for routine control measures, such as
  - Providing catch-up immunization;
  - Improving safe utilization of sharps, use of barrier protective measures, etc.; and
  - Enhancing public education about individual protection against blood-borne infections and STDs.
- Evaluate and improve the performance of the surveillance system (e.g., reaction time for notification, specimen collection).

Figure 23. Acute Hepatitis B Outbreak Investigation Card

# of facility and date Registration # in NCDC Region rayon

Monthly IV- 7/HB

SECTION I (CASE INFO)						
#		Patient #1	Patient #2	Patient #3	Patient #4	Patient #5
1.	Name					
2.	Date of birth					
3.	Address					
4.	Age					
5.	Group case	Yes No	Yes No	Yes No	Yes No	Yes No
6.	Date of disease onset	/ /Day/ /Mo/ /Yr	/ /Day/ /Mo/ /Yr	/ /Day/ /Mo/ /Yr	/ /Day/ /Mo/ /Yr	/ /Day/ /Mo/ /Yr
7.	Results of laboratory confirmation tests	1. Anti HBc 2. HBs Ag	1. Anti HBc 2. HBs Ag	1. Anti HBc 2. HBs Ag	1. Anti HBc 2. HBs Ag	1. Anti HBc 2. HBs Ag
8.	Date of lab results	/ /Day/ /Mo/ /Yr	/ /Day/ /Mo/ /Yr	/ /Day/ /Mo/ /Yr	/ /Day/ /Mo/ /Yr	/ /Day/ /Mo/ /Yr
9.	Date of notification to CPH	/ /Day/ /Mo/ /Yr	/ /Day/ /Mo/ /Yr	/ /Day/ /Mo/ /Yr	/ /Day/ /Mo/ /Yr	/ /Day/ /Mo/ /Yr
10.	Date of epid investigation	/ /Day/ /Mo/ /Yr	/ /Day/ /Mo/ /Yr	/ /Day/ /Mo/ /Yr	/ /Day/ /Mo/ /Yr	/ /Day/ /Mo/ Yr
11.	Hospitalization	Yes No Where_____	Yes No Where_____	Yes No Where_____	Yes No Where_____	Yes No Where_____
12.	Outcome	Died Alive Unknown	Died Alive Unknown	Died Alive Unknown	Died Alive Unknown	Died Alive Unknown
13.	Number of immunizations received	_____ Unknown	_____ Unknown	_____ Unknown	_____ Unknown	_____ Unknown
14.	Last vacciantion date	/ /Day/ /Mo/ /Yr	/ /Day/ /Mo/ /Yr	/ /Day/ /Mo/ /Yr	/ /Day/ /Mo/ /Yr	/ /Day/ /Mo/ Yr
15.	Risk factor and source of infection					

Responsible Person_____ name, position)_____
Signature_____

The card should be completed for each case and submitted to the region CPH before day 5 and to NCDC (Tbilisi, 380077, st. M. Asatiani #9, Tel. 37-16-77.39-64-38) before day 7 of the next month.

To be filled ant kept at CPH						
16.	Place of work, school or children's setting					
17.	If not vaccinated specify reasons.	○ No Vaccine ○ Refusal ○ Contraindication ____________established by Dr. _____________ ○ Other____________	○ No Vaccine ○ Refusal ○ Contraindication ____________established by Dr. _____________ ○ Other____________	○ No Vaccine ○ Refusal ○ Contraindication ____________established by Dr. _____________ ○ Other____________	○ No Vaccine ○ Refusal ○ Contraindication ____________established by Dr. _____________ ○ Other____________	○ No Vaccine○ Refusal ○ Contraindication ____________establishe d by Dr. _____________ ○ Other____________
SECTION II (POTENTIAL EXPOSURE TO INFECTION 50-180 DAYS PRIOR TO ONSET and SOURCE OF INFECTION)						
	▫ contact with an acute or chronic hepatitis case? ▫ dental work or surgery? ▫ other surgery? ▫ medical injections or vaccinations with non-disposable needles/ syringes? ▫ invasive diagnostic or endoscopic procedures? ▫ used needles to inject drugs? ▫ accidental stick with a needle/ object contaminated with blood? ▫ cosmetic manipulations? ▫ acupuncture? ▫ tattooing? ▫ ear piercing? ▫ employed in a medical, dental or other field involving contact with human blood? ▫ received blood or blood products? ▫ multiple sexual partners? ▫ associated with a dialysis or transplant unit?	Sexual ○ Household ○ Other _________ YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO	Sexual ○ Household ○ Other _________ YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO	Sexual ○ Household ○ Other _________ YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO	Sexual ○ Household ○ Other _________ YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO	Sexual ○ Household ○ Other _________ YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO YES NO
18.	Provide details					
19.	Common exposure with any other case?	YES NO Which one__________	YES NO Which 0ne___________	YES NO Which one___________	YES NO Which one__________	YES NO Which one________
20.	Potential source of infection					

21.	Safety of practices by source Sterilization adequate? Sharps/waste utilization safe? Barrier methods implemented? Blood screening tests sensitive?	YES YES YES YES	NO NO NO NO	YES YES YES YES	NO NO NO NO	YES YES YES YES	NO NO NO NO	YES YES YES YES	NO NO NO NO	YES YES YES YES	NO NO NO NO
22.	Provide details										

SECTION III (RESPONSE)

List of contacts for post-exposure prophylaxis

	Full name	Age	Address	Place of study/work	Type of contact (household, sexual, suspected blood or perinatal exposure)	Susceptible /Immune?	Date immunization started	Date immune globulin given

Implemented measures aimed at the source of infection to stop further transmission

1.

2.

3.

Other outbreak control measures:

1.

2.

3.

Comments/Conclusions:

Responsible person _____ _____(name, position)

PROTOCOL FOR LABORATORY CONFORMATION OF ACUTE VIRAL HEPATITIS

Sampling strategy: Collect specimens from every probable/clinical case of acute viral hepatitis (except for an outbreak of hepatitis A, where it is required to confirm at least one case, provided that all cases are epidemiologically linked, or every case, where such link can not be established.

Confirmation test: Serological assay. Demonstration of IgM antibody to hepatitis B core antigen (anti-HBc) or hepatitis B surface antigen (HBsAg) if the previous test cannot be done.

Specimen to be collected: Serum or plasma

Referral laboratory: Contact regional CPH for a list of NCDC recognized/recommended labs in your area.

I. DOCUMENTATION

Supplies needed:

- ○ Register 60/A
- ○ Lab investigation request form
- ○ Marker (water resistant)
- ○ Specimen label

Steps:

1. Create a specimen label with patient's name, identification number, date, and time.
2. Fill in a copy of a lab investigation request form with patient information. (It will accompany specimen to the lab).
3. Make sure patient information has been entered in Journal 60/A and an urgent notification has been sent to CPH.

II. COLLECTION AND HANDLING

Note: collect a single serum at the first contact with patient

Supplies needed:

- ○ Gloves
- ○ Vacutainer tube with needle
- ○ Tourniquet
- ○ Sterilizing swabs
- ○ Pipette
- ○ Adhesive tape
- ○ Band aid

Steps:

1. Collect 5ml of blood by venipuncture into a sterile tube (without anticoagulant) labeled with patient identification and collection date, and time.
2. Allow blood to clot.
3. Centrifuge blood at 1000g for 10 minutes to separate the serum.

   * Blood can be stored at 4-8^{0}C for up to 24 hours before the serum is separated. Do not freeze whole blood. If there is no centrifuge, blood should be kept in refrigerator until there is complete retraction of the clot from the serum.
4. Carefully remove the serum with a pipette, avoiding extracting red cells, and transfer it aseptically into a sterile labeled vial.

   * If vaccutainer tubes containing a gel (yellow cap) are used, serum does not need to be separated after centrifugation manually. (The gel will provide this function).
5. Make sure vial is properly labeled (see Section I).

III. STORAGE

Store serum at 4-8^{0}C until it is ready for shipment for up to 7 days. (Sera must be frozen at -20^{0}C for longer periods of storage; in this case, avoid repeated freezing and thawing.)

Whole blood may be held at 4-8^{0}C if it can be transported to arrive at the testing lab within 24 hours.

IV. TRANSPORTATION

Supplies needed:

- ○ Ziplock plastic bag
- ○ Plastic container
- ○ Cold box with ice packs
- ○ Box label

Steps:

1. Tighten the cap, apply waterproof sealing tape over the cap and top of specimen container.
2. Place specimen container in a suitably sized plastic bag (1st layer) together with a small amount of absorbent material, such as cotton wool. The bag must be sealed either using heated bag sealer or waterproof adhesive tape; as an alternative, use ziplock plastic bags. Specimens from different patients should never be sealed in the same bag.
3. Sealed bags containing the specimens should be placed inside plastic containers with screw-cap lids (2nd layer). Provided that specimens have been double-agged properly in sealed plastic bags, specimens from several patients may be packed inside the same secondary plastic container. Additional absorbent material should be placed inside the container to absorb any leakage that may occur.
4. Sealed plastic containers should be fitted into insulated 3rd layer containers (e.g., a cold box). First place ice packs at the bottom of the box, and, along the sides, place the plastic container with the specimen in the center, then place more ice packs on top.
5. Put the lab investigation request form in a plastic bag and place it in the outer box
6. Label box with name, address, and telephone number of the referral laboratory and the sender.
7. Label box with the safety precautions ("Do not freeze," "Do not expose to heat," "This side up," "Biological specimen," etc.).
8. Arrange shipping date.
9. When arrangements are finalized, inform the recipient of time and manner of transport and make sure that package reaches referral laboratory within 2–3 days of specimen collection.

V. COMMUNICATING TEST RESULTS

Laboratory should communicate results to the clinician within 2 days of receiving the sample. If the result of the test is positive, it should also notify the rayon CPH.

Steps:

1. Record the results in the case history and the Journal 60/A.

10.7 Diphtheria

10.7.1 Rationale for Surveillance

A major epidemic of diphtheria in the 1990s killed more than 150 people in Georgia. Many of those who survived suffered from severe complications of this disease caused by remote effects of the diphtheria toxin, such as myocarditis and nerve paralysis. The epidemic control measures including mass immunization of the country population, laboratory testing, and treatment of 2000 patients and many thousands of contacts required a lot of material and human resources.

It is well known that the epidemic in Georgia, as well as in other countries of the European Region, has been caused primarily by a lack of routine immunization of adults and low coverage in children. The epidemic has highlighted the need for adequate surveillance and epidemic preparedness. Some of the fatalities could have been prevented if the cases had been detected earlier in the course of the disease and diphtheria antitoxin administered at an earlier stage.

Now that the epidemic is fully controlled, surveillance information will be used primarily to monitor the effectiveness of the routine disease prevention and control program and to characterize infected patients and areas so that additional intervention efforts can be focused on assessing and reducing the missed opportunities for vaccination, providing necessary anti-microbial prophylaxis, and enhancing epidemic preparedness activities.

The Georgia National Health Policy envisions reduction of diphtheria incidence < 0.1 per 100,000 population and elimination of diphtheria fatality by 2006 through the following ***strategies***:

- Achieve more than 90 percent coverage of infants and children with routine immunization (target 95 percent). The immunization schedule calls for a five-dose immunization schedule: primary series of three doses of DPT reinforced with a first DPT booster dose in the second year of life and a second booster DT given at the age of five years.
- Achieve more than 85 percent coverage of adolescent and adult population Td boosters, given at 10-year intervals.
- Provide prompt detection, appropriate case management, and availability of adequate supplies of antitoxin and antibiotics.
- Conduct rapid case investigation and management of close contacts.
- Conduct appropriate outbreak management.
- Ensure adequate surveillance and strengthening of laboratory network.

10.7.2 Recommended Diphtheria Case Definition

Clinical description: Diphtheria is an acute illness characterized by

- laryngitis **or** pharyngitis **or** tonsillitis **and**
- an adherent membrane of the tonsils, pharynx, and/or nose.

Case classification

- ***Probable (clinical:)*** A case that meets the clinical description of diphtheria
- ***Confirmed:*** A case clinically compatible with at least one of the following:
  - Isolation of toxin-producing *Corynebacterium diphtheria or C.ulcerans* from a clinical specimen, **or**
  - An epidemiological link[19] to a confirmed case.

Note: Nonrespiratory/cutaneous diphtheria cases with isolation of toxigenic strains should be reported, as should asymptomatic carriers (any anatomical site) with toxigenic strains. Cases with nontoxigenic *C.diphtheriae* or *C.ulcerans* should not be reported.

Laboratory testing is currently mandated for every clinical (probable) case of diphtheria. The regional CPH can be contacted to obtain the most current list of NCDC recognized/recommended laboratories in the area.

10.7.3 Case Notification Procedures and Forms

Any clinical (probable) or confirmed case of diphtheria identified by providers or isolation of *Corynebacterium diphtheriae* or *C. ulcerans* by any laboratory requires urgent notification of the CPH within 24 hours by any existing means of communication. General requirements are outlined in more detail in Chapter 4.

10.7.4 Diphtheria Case/Outbreak Investigation

Rapid recognition and investigation of the disease is important to ensure early appropriate treatment with diphtheria antitoxin, obtain necessary laboratory specimens before antibiotic or antitoxin treatment, identify and evaluate contacts, and provide necessary antimicrobial prophylaxis to prevent further spread.

Note: Every single reported diphtheria case has to be investigated by a rayon CPH epidemiologist in cooperation with NCDC and regional CPH experts and facility health workers within 2 business day of notification. The following steps are required for investigation (see also Chapter 6):

a) Verify that all cases meet the clinical description of diphtheria by reviewing medical records.

b) Collect data as envisioned in the diphtheria investigation card (see Figure 24).

The collected data should be verified against the information found in the health facility's infectious disease register 60/A. All newly identified cases as a result of the investigation should be recorded in this register as well. Facilities should follow up with recent cases of tonsillitis (registered within 7 to 10 days) for signs of diphtheria and continue filling out the investigation card for all new clinical (probable) cases identified.

[19] Epidemiological link is defined as a close contact (household, work/school setting, etc.) with a confirmed case 2-7 days prior to the onset of symptoms.

c) Identify the source of infection and establish epidemiological links.

Check if diphtheria patients were in close contact with a confirmed case two to seven days prior to onset of symptoms to determine the existence of an epidemiological link.

d) Assess potential for transmission and identify close contacts.

Risk of contracting diphtheria is directly related to the proximity and the duration of the contact. A *close contact* is someone having cared for, having lived with, or having had direct contact with respiratory secretions of a clinical (probable) or confirmed case in the past seven days. Those are likely to be in the following groups:

- Household members living in the same house or apartment
- Friends, relatives, or caretakers who visited the patient at home
- Dates or sexual partners
- Classmates in the school or persons working in the same office.

A wider search for carriers is very complicated, expensive, and nonproductive.

e) Collect specimens from all the patients (if not done yet) and their close contacts.

All patients and their close contacts should have specimens taken from the nose and throat and from the membrane (i.e., both nasopharyngeal and pharyngeal swabs) for a culture prior to administration of antibiotics. If possible, swabs should be taken from beneath the membrane. Even if treatment with antibiotics has begun, specimens should be taken, but the likelihood of the bacteria isolation will be much smaller.

Serologic testing is recommended prior to the administration of antitoxin for cases only. Measurement of the patient's serum antibodies may help in assessing the probability and the course of diphtheria. If antibody levels are low (<0.01 iu/ml), diphtheria cannot be ruled out even if the culture is negative, but if levels are high, *C. diphtheria* is less likely to produce serious illness.

f) Implement control and prevention measures (see next section).

g) Write a report and send it to the regional CPH in two copies (the region CPH will forward one copy to NCDC). The report includes:

- The first part of the **Diphtheria Investigation Card** (see Figure 24) completed for each single case (number of cases in the card(s) should correspond to the number of cases indicated in the monthly report form)
- **Cluster Investigation Report**, which is prepared for group cases

h) Inform local health administration and other stakeholders about outbreak/group cases verbally or in a written form.

Figure 24. Diphtheria Investigation Card

Registration # Month _____ Facility _____ Rayon _____

Part I **Monthly IV-03 8/Diph**

#	If information is additional indicate*	Patient #1	Patient #2
	Name		
1.	Age		
2.	City, rayon, address		
3.	Institutional setting?	Yes No	Yes No
4.	Group case	Yes No	Yes No
5.	If yes, what?	Kindergarten, School, High school, Office	Kindergarten, School, High school, Office
6.	Contact with sick person or carrier? If yes, when and with whom?	Day/ /month / /Year / / Name_____	Day/ /month / /Year / / Name_____
7.	When did s/he became ill?	Day/ /month / /Year / /	Day/ /month / /Year / /
8.	When did s/hevisited doctor for the first time and at what facility?	Day/ /month / /Year / / Facility_____	Day/ /month / /Year / / Facility_____
9.	Date diphtheria diagnosed for the first time	Day/ /month / /Year / /	Day/ /month / /Year / /
10.	Date of notification to CPH	Day/ /month / /Year / /	Day/ /month / /Year / /
11.	Date of investigation	Day/ /month / /Year / /	Day/ /month / /Year / /
12.	Date of first diagnosis	Day/ /month / /Year / /	Day/ /month / /Year / /
13.	Hospitalized when, where?	Day/ /month / /Year / / Hospital_____	Day/ /month / /Year / / Hospital_____
14.	Final diagnosis	Local, Generalized, Toxic	Local, Generalized, Toxic
15.	Antitoxin given? If yes, when and what amount?	/ / / /_____ units Day month year	/ / / / _____units Day Month Year
16.	Date and time of specimen collection	hr/ Day/ /month / /Year /	hr/ Day/ /month / /Year /
17.	Date antibiotics started?	Day/ /month / /Year / / Before culture? Y/N	Day/ /month / /Year / / Before culture? Y/N
18.	Outcome	Died, discharged / / / / Day Month Year	Died, discharged/ / / / Day Month Year
19.	If dead, indicate cause.		
20.	Culture dates and results (biotype and toxigenicity of strain, if culture positive) If not done, please, indicate NOT DONE.	1. 2. 3. 4.	1. 2. 3. 4.
21.	DT or Td given before discharging?	Yes No	Yes No
22.	Number of received vaccinations	_____ unknown	_____ unknown
23.	Date of last vaccination and vaccine type	Day/ /month / /Year / / _____ unknown	Day/ /month / /Year / / _____ unknown
24.	How many people were in close contact?		
25.	How many of them tested bacteriologically?		
26.	From how many was *C. diphtheria* isolated?		

* If the information represents additional data on the case already reported, please indicate this.

Responsible Person_____ Signature_____

Name Tel: _____ Address, fax, E-mail_____

The card should be submitted to the region CPH before day 5 and to NCDC (Tbilisi, 380077, st. M. Asatiani #9, Tel. 37-16-77.39-64-38) before day 7 of the next month **for each diphtheria case.**

Part II (to be filled and kept at CPH)			
27.	If doses <3 for children less than 4 months indicate reason		
28.	How many received prophylaxis w/antibiotics?		
29.	How many were vaccinated?		

Response actions

list of contacts

	name	age	address	Lab investigation / results	measures taken: antibioticprophylaxis, vaccination

Other outbreak control measures implemented:

1

2

3

3.

Comments/Conclusions:

Responsible person _____ _____(name, position)

10.7.5 Outbreak Control/Response

An outbreak of diphtheria requires the following control actions by the health facility and rayon CPH:

1. If diphtheria is suspected on the basis of clinical findings, antitoxin[20] should be given ***immediately*** after bacteriologic specimens are taken, without waiting for results, since it can only neutralize circulating toxin and has no effect on toxin already bound to tissue. Late administration of antitoxin (after the third day from disease onset) may not help reduce the risk of development of diphtheria complications (toxic shock, myocarditis, neuritis) and a fatal outcome.

Note: Physicians who do not have antitoxin at their disposal must promptly inform the regional health administration.

2. Diphtheria patients should be isolated until two cultures are taken from both throat and nose not less than 24 hours apart, and not less than 24 hours after cessation of anti-microbial therapy, and fail to show diphtheria bacilli. Where cultures are not done, isolation may be ended after 14 days of appropriate antibiotic treatment.

3. Articles in contact with patient or soiled by discharges of patient should be disinfected.

4. Diphtheria patients should get a booster or start/continue vaccination series (if not immunized) prior to discharge from a hospital, because development of natural immunity after diphtheria cannot be guaranteed.

5. ***Close diphtheria contacts (see Section 10.7.4 d)*** should do the following:

    - △ Undergo bacteriological investigation as described above
    - △ Remain under clinical surveillance for signs/symptoms specific for diphtheria for seven days after the last contact with a diphtheria case
    - △ Be offered prophylactic antibiotics irrespective of their immunization status. Those cases where *C. diphtheriae* was isolated must be cultured again at the end of the preventive course to assure eradication of the organism
    - △ Get a booster of diphtheria toxoid if more than 3 years have elapsed since their last dose, or initiate/continue a primary series (if they were not immunized) with Td if they are older than 7 years of age or administer the DPT/DT if they are young children.

10.7.6 Recommended Scope of Routine Analysis of Diphtheria Surveillance Data to Be Performed by CPH

(See Chapter 5 for more details.)

The CPH should perform routine monthly analysis of the following data:

- ▲ DPT-3 (at 12 months), DPT-4 (at 24 months), DT (at 6 years) and Td (at 14 years and among

[20] The recommended dosage and route of administration of diphtheria antitoxin depend on the extent and duration of the disease. Detailed recommendations can be obtained from the MoLHSA order #58. Treatment with a 14-day course of antibiotics should be promptly started as well.

adults) coverage by subordinated area/setting

- Cases by month/year, age group, immunization status, and geographic area
- Proportion of cases laboratory tested
- Case/laboratory confirmation rates for the territory
- Proportion of cases treated with antitoxin "on time" (≤ 3 days from the onset of symptoms)
- Major reasons for late treatment with antitoxin:
  - Patient sought care too late
  - Diphtheria was not recognized promptly
  - Physicians delayed measures aimed at ensuring immediate start of the specific treatment
  - CPH/NCDC failed to ensure availability of antitoxin at the place of patient's hospitalization
- Completeness/timeliness of monthly reporting
- Diphtheria case/outbreak investigation rate.

10.7.7 Principle Uses of Data for Decision Making at the Regional and Rayon Levels

The regional- and rayon-level CPHs will use the data primarily to accomplish the following:

1. Monitor diphtheria vaccination and booster coverage in all age groups by geographic area to identify areas with weak program performance where action needs to be taken to correct the situation.
2. Promptly identify cases and outbreaks and determine why they occurred (e.g., failure to immunize, vaccine failure, accumulation of susceptibles, waning immunity). Implement respective measures to stop further transmission and monitor the effectiveness of the control strategies.
3. Determine age-specific incidence rates, immunization status of cases, and other factors to understand epidemiology of diphtheria and define risk groups. Implement respective routine control strategies such as local Td booster campaigns for adolescents and adults or selected high-risk groups.
4. Determine major reasons for late treatment of diphtheria patients with antitoxin and implement measures to address them, such as
   - enhancing provider education,
   - making a regional reserve of diphtheria antitoxin, and
   - health education of population.
5. Evaluate and improve the performance of other aspects of the diphtheria surveillance system (e.g., reaction time for notification, proportion of cases laboratory tested) and take corrective measures as appropriate.

PROTOCOL FOR LABORATORY CONFORMATION OF DIPHTHERIA

Sampling strategy: Collect specimens from every probable/clinical case of diphtheria.

Confirmation test: Isolation of toxin-producing Corynebacterium diphtheria or C. ulcerans by bacterial culture.

Specimen to be collected: Pharyngeal and nasal or naso-pharyngeal swabs (skin lesion swabs in case of skin diphtheria, eye swab in case of eye diphtheria)

Referral laboratory: Contact regional CPH for a list of NCDC recognized/recommended labs in your area.

Referral laboratory: NCDC Phone: 39 89 46 / 39 64 38.

I. DOCUMENTATION

Supplies needed:

- ○ Register 60/A
- ○ Marker (water resistant)
- ○ Lab investigation request form
- ○ Specimen label

Steps:

1. Create a specimen label with patient's name, identification number, date, and time.
2. Fill in a copy of a lab investigation request form with patient information. (It will accompany specimen to the lab).
3. Make sure patient information has been entered in register 60/A and an urgent notification has been sent to CPH.

II. COLLECTION AND HANDLING

Note: Collect both throat and nasal, or naso-pharyngeal swabs, preferably before administration of antibiotics, at the first contact with patient .

Supplies needed:

- ○ Dacron or calcium alginate swabs (rayon or cotton swabs)
- ○ Sterile saline solution
- ○ Blood agar slant
- ○ Amies or Stewart's transport medium

Steps:

Throat swabs:

1. Pharynx should be clearly visible and well illuminated.
2. Depress tongue with an applicator and swab the throat without touching the tongue or inside of check.
3. Rub vigorously over any membrane, white spots or inflamed areas; slight pressure with a rotating movement must be applied to the swab.
4. The swab is extended between the tonsillar pillars and behind the uvula. Care should be taken not to touch the lateral walls of the buccal cavity or the tongue to minimize contamination with commensal bacteria.
5. Having the patient phonate a long "aaah" serves to lift the uvula and helps prevent gagging.
6. The tonsillar areas and the posterior pharynx should be firmly rubbed with the swab.
7. If any membrane is present, swab from the edge of membrane. Any purulent exudate should also be sampled.

IV. TRANSPORTATION

Supplies needed:

- ○ Ziplock plastic bag
- ○ Shipping box/container
- ○ Plastic container
- ○ Box label

Steps:

1. Tighten the cap, apply waterproof sealing tape over the cap and top of specimen container.
2. Place specimen container in a suitably sized plastic bag (1st layer) together with a small amount of absorbent material, such as cotton wool. The bag must be sealed either using heated bag sealer or waterproof adhesive tape; as an alternative, use ziplock plastic bags. Specimens from different patients should never be sealed in the same bag.
3. Sealed bags containing the specimens should be placed inside plastic containers with screw-cap lids (2nd layer). Provided that specimens have been double-bagged properly in sealed plastic bags, specimens from several patients may be packed inside the same secondary plastic container. Additional absorbent material should be placed inside the container to absorb any leakage that may occur.
4. Sealed plastic containers should be fitted into insulated 3rd layer containers (e.g., a cold box). First, place ice packs at the bottom of the box, and, along the sides, place the plastic container with the specimen in the center, then place more ice packs on top. Make sure that the container is firmly fixed in the outer box.
5. Put the lab investigation request form in a plastic bag and place it in the outer box.
6. Label box with name, address, and telephone number of the referral laboratory and the sender.
7. Label box with the safety precautions ("Do not freeze," "Do not expose to heat," "This side up," "Biological specimen," etc.).
8. Arrange shipping date.
9. When arrangements are finalized, inform the recipient of time and manner of transport and make sure that package reaches referral laboratory within 2–3 days of specimen collection.

Nasal swabs Nasal specimens are obtained under direct light using over-the-shoulder illumination using the aseptic technique to prevent contamination by other micro-organisms. 1. Gently elevate the nose with the thumb of one hand. 2. Moisten the tip of a small flexible wire nasal swab with sterile water or saline and gently insert it into one of the nostrils. 3. Guide the swab with rotate movement till 1/3 of the nasal septum. 4. Take the specimen with the same swab from the second nostril. *Naso-pharyngeal swabs* Naso-pharyngeal specimens are obtained under direct light using over-the-shoulder illumination using the aseptic technique to prevent contamination by other micro-organisms 1. Gently elevate the nose with the thumb of one hand. 2. Moisten the tip of a small flexible wire naso-pharyngeal swab with sterile water or saline and gently insert it into one of the nostrils. 3. Guide the swab backward and upward along the nasal septum until a distinct feel of resistance indicates that the posterior pharynx has been reached. 4. Gently remove the swab. If while guiding the swab undue resistance is met, attempt the procedure through the opposite nostril (pay attention if a tear drop appears – you are in the right place!) *Skin diphtheria and other lesions* 1. Lesions should be cleansed with normal saline and crusted material removed. 2. Press the swab firmly into the lesion. **Note:** In case of skin or eye diphtheria the throat and nasal specimens should be taken as well. **After collection**, inoculate the specimen on Amies or Stewart's transport medium or Blood agar. **Note**: If these media are unavailable place the swab in the sterile container or special packet containing silikagel and send promptly to the lab. In this case, the specimen should arrive at the laboratory within 2 hours.	
III. STORAGE	**V. COMMUNICATING TEST RESULTS**
Steps: 1. Specimen inoculated on the transport media can be stored at room temperature (25^0C) for up to 24 hours until shipment. 2. If transportation is delayed, the specimen with the help of an epidemiologist should be inoculated on the Blood agar and placed in a thermostat at 37^0C (for 24-48 hours). 3. In other cases the specimen should be decontaminated. If the facility is not able to decontaminate, the specimen should be sent to the laboratory for this purpose.	Laboratory should communicate results to the clinician within 2 days of receiving the sample. If the result of the test is positive, it should also notify the rayon CPH. **Steps:** 1. Record the results in the case history and Journal 60/A.

10.8 Poliomyelitis

10.8.1 Rationale for Surveillance

Infection with poliovirus results in a spectrum of clinical manifestations from inapparent infection to non-specific febrile illness, aseptic meningitis, paralytic disease, and death. Two phases of acute poliomyelitis can be distinguished: a nonspecific febrile illness, followed in 0.1 to 1.0 percent of patients by aseptic meningitis and/or paralytic disease. Depending on the site of paralysis, poliomyelitis can be classified as spinal, bulbar, or spino-bulbar disease. Progression to maximum paralysis is rapid (two to four days), usually associated with fever and muscle pain, and it rarely continues after the temperature has returned to normal. Spinal paralysis is typically asymmetric, more severe proximally than distally, and deep tendon reflexes are absent or diminished. Bulbar paralysis may compromise respiration and swallowing. Between 2 and 10 percent of cases of paralytic poliomyelitis are fatal.

Poliomyelitis is targeted for eradication. In June 2002, Georgia as well as other European countries was certified by WHO as polio free. Experts noted that Georgia has established a good system of Acute Flaccid Paralysis (AFP) surveillance and that no indigenous wild polioviruses have been isolated in the country since 1991. Routine oral poliomyelitis vaccine (OPV) coverage rates have been steadily increasing and are now believed to be greater than 80 percent. One case of vaccine-associated paralytic poliomyelitis (VAPP) was reported in 1997.[21] Despite the success of polio eradication activities, the potential for importation of wild poliovirus into Georgia will remain until worldwide poliomyelitis eradication is achieved.[22]

Highly sensitive surveillance for AFP, including immediate case investigation and specimen collection, is critical to detect potential wild poliovirus circulation with the ultimate objective of polio eradication. Countries with adequate surveillance systems should find at least one case of AFP each year for every 100,000 children less than 15 years of age. This minimum annual rate is based on the fact that in absence of wild poliovirus transmission, cases of AFP due to other causes (e.g., Guillain Barre syndrome, transverse myelitis, or tumors) will continue to occur. Therefore, a sensitive AFP surveillance system would be expected to detect these background cases, even when wild poliovirus is not circulating in a country.

Examination of sewage specimens for poliovirus (environmental surveillance) was adopted as a supplementary tool in the surveillance of poliomyelitis in Georgia to determine if “silent” transmission of poliomyelitis in the population takes place. Approximately 50 sewage samples are tested annually. Wild poliovirus not been detected in the past 5 years.

Other strategies include maintaining and increasing routine OPV-3 coverage (target 98 percent), implementing additional immunization measures such as national/subnational immunization days and regular mop-up campaigns in border zones and hard-to-reach territories, where local circulation of the virus might take place.

[21] VAPP is a very rare disease with a risk of about one case per 2.5 million doses of OPV administered.

[22] A nonparalytic case of confirmed imported wild poliovirus infection caused by poliovirus type 1, originating from the Indian subcontinent, occurred in Kvemo Kartli Region in 2001. The case was clinically manifested as meningoencephalitis and classified as nonparalytic polio.

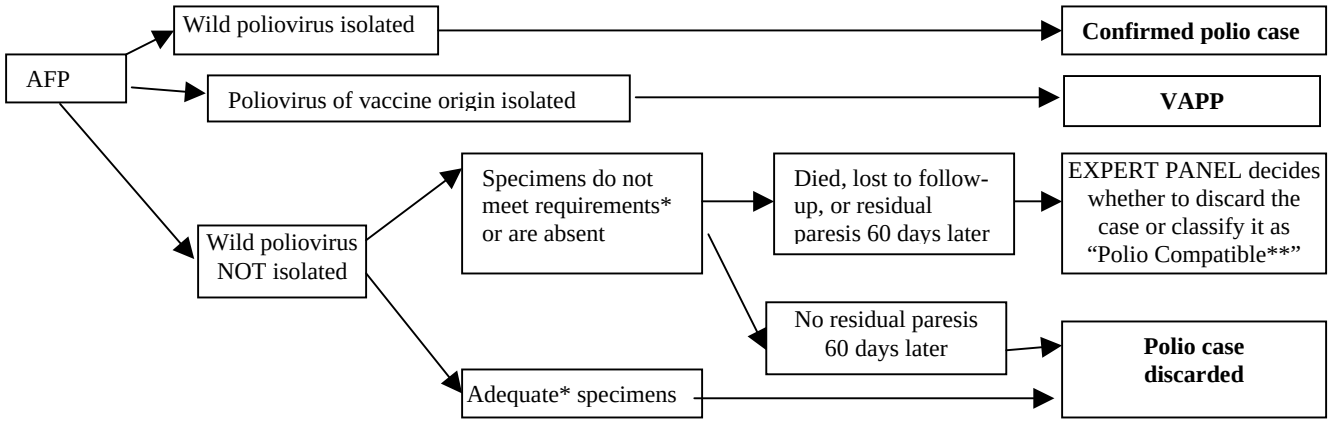
10.8.2 Recommended Polio Case Definition

Clinical (probable) Case – A case that meets the following criteria:

- Any case of AFP rapidly developed within one to four days (including Guillain Barre syndrome[23]) in children aged 0-15 years (except for paralysis of confirmed traumatic or tumor etiology), **or**
- Any person at any age in which a physician suspects acute poliomyelitis

Note: These suspected diagnoses can be used for a limited period of time, and a ***final case classification must be made within 70 days of disease onset by the National Expert Panel***, according to the scheme presented in Figure 25.

Figure 25. AFP/Polio Case Classification Scheme



* Specimens are adequate if two specimens were collected 24 to 48 hours apart and within 14 days of paralysis onset. The specimen arriving at the laboratory must be of adequate volume (8 to 10 grams), have appropriate documentation (i.e., laboratory request form) and be in "good condition." Good condition means no leakage, no desiccation, and evidence that the reverse cold chain was maintained (based on the presence of ice or temperature indicator).

** "Compatible" cases indicate surveillance failures and should be monitored for clustering in space and time.

Laboratory testing is mandated for every AFP and suspected polio case. Specimens should be sent to the National Polio Laboratory accredited by WHO. This laboratory is located at NCDC.

10.8.3 Case Notification Procedures and Forms

Any AFP or suspected polio case identified by providers requires urgent notification to the CPH within 24 hours by any existing means of communication.

[23] Guillain Barre syndrome, also known as Landry's ascending paralysis, is an acute idiopathic inflammatory demyelinating polyneuropathy characterized by the rapid onset of weakness and, often, paralysis of the legs, arms, breathing muscles, and face. The exact cause is unknown, but has been associated with abnormal immune response to viral infection.

10.8.4 AFP/Polio Case Investigation

Rapid recognition of suspected poliomyelitis cases is critical to identifying possible wild poliovirus transmission. It will allow collection of specimens for poliovirus isolation, which is critical for ruling out or confirming paralytic poliomyelitis, whether wild virus associated or vaccine related. Rapid detection of wild poliovirus-associated cases will permit the timely implementation of control efforts.

Note: Every single reported AFP or polio case has to be investigated by an investigation team led by an NCDC expert and including an expert neurologist, regional and rayon CPH epidemiologists, and facility health workers, within 2 business days of notification.

The following steps are required for the investigation:

a) Collect data as envisioned in Section I of the AFP Investigation Card (shown in Figure 26).

Figure 26. AFP Investigation Card

SECTION I	
General information	
Date of investigation /------/-------/----------/	Epidemiological number*
Patient's name and surname	Gender ○*Male* ○*Female*
Address	
Father's name and surname	Mother's name and surname
Patient's date of birth /------/------/--------/ or indicate age ___years	
Case registration and hospitalization	
Date of the first visit to a physician after AFP onset	/------/-----/--------/
Indicate the name of the facility visited	
Date of urgent notification	/------/-----/--------/
Date of hospitalization	/------/-----/--------/
Place of hospitalization	
Case history number	
Clinical diagnosis	
Name of diagnosing physician	
Clinical information	
Date of paralysis onset	/-----/-----/-------/
If the patient died, indicate date	/-----/-----/-------/
Seizures or other neurological disorders?	○*Yes* ○*No* ○*Unknown*
If yes, specify:	
Is paralysis acute (quickly progressing)?	○*Yes* ○*No*
Is paralysis flaccid?	○*Yes* ○*No*
If the paralysis is neither acute nor flaccid – STOP the investigation. If the diagnosis is known – specify it here:	
Are there other confirmed causes of paralysis (e.g., trauma)	○*Yes* ○*No*
If yes, indicate the cause and STOP the investigation. If no - poliomyelitis is possible. Investigation should be continued	
Did the patient have temperature at paralysis onset?	○*Yes* ○*No*
Is the paralysis asymmetrical?	○*Yes* ○*No* ○*Unknown*

Paralysis location				
	Left leg	○*Yes*	○*No*	○*Unknown*
	Right leg	○*Yes*	○*No*	○*Unknown*
	Left hand	○*Yes*	○*No*	○*Unknown*
	Right hand	○*Yes*	○*No*	○*Unknown*
	Respiratory muscles	○*Yes*	○*No*	○*Unknown*
	Neck muscles	○*Yes*	○*No*	○*Unknown*
	Facial muscles	○*Yes*	○*No*	○*Unknown*
	Other muscles specify_____	○*Yes*	○*No*	○*Unknown*
Travel history				
Did the patient travel farther than 10km from his house within 28 days preceding the paralysis onset?		○*Yes*	○*No*	○*Unknown*
If yes date of leaving /-------/-----/--------/		date of return /-------/-----/--------/		
Did the patient visit another country? If yes – which one?		○*Yes*	○*No*	○*Unknown*
If not, specify the names of rayon(s) and towns/villages visited in Georgia				
Have any other paralysis cases been reported in places visited by the patient within 60 days from the onset of paralysis in this case?		○*Yes*	○*No*	○*Unknown*
Immunization history				
Are patient's immunization records available?		○*Yes*	○*No*	○*Unknown*
Specify OPV doses received and type of evidence	OPV-1	○*Documental*	○Verbal	○*Unknown*
	OPV-2	○*Documental*	○Verbal	○*Unknown*
	OPV-3	○*Documental*	○Verbal	○*Unknown*
	OPV-4	○*Documental*	○Verbal	○*Unknown*
	OPV-5	○*Documental*	○Verbal	○*Unknown*
Additional OPV doses received during mass campaigns	First	○*Documental*	○Verbal	○*Unknown*
	Second	○*Documental*	○Verbal	○*Unknown*
	Third	○*Documental*	○Verbal	○*Unknown*
Date of the last OPV dose		/-------/------/-------/		
Was anyone living with the case vaccinated with OPV during 28 days prior to the onset of paralysis?		○*Yes*	○*No*	○*Unknown*
Fecal sample collection				
Date first sample taken /-------/------/-------/		date sent to NCDC /-------/------/-------/		
Date second sample taken /-------/------/-------/		date sent to NCDC /-------/------/-------/		
Have specimens from contacts been taken? If yes, from how many people? _____		○*Yes*	○*No*	○*Unknown*

Name, Last name of person who carried out investigation_____ Signature_____

The card should be submitted to the region CPH before the fifth day and to NCDC before seventh day of the next month

* A 12-symbol epidemiological number is assigned to every suspected polio case. Detailed instructions on how to assign a number are specified in the MoLHSA order #243/O dated July 2, 1997. Codes for administrative levels are provided in Annex B.

b) Collect two stool specimens from the case.

Two stool specimens should be obtained within 14 days from the paralysis onset with a 24- to 48-hour interval. Samples should not be dry and should be obtained in sufficient amount (approximately 8 to 10 grams). Transport media is not needed for stool sample transportation; it could be sent in hermetically closed Penicillin vial (not necessarily washed) or in a similar sterile vial observing cold chain requirements (+4 to 8^{o}C).

Samples should be sent to the NCDC for investigation, accompanied by a referral form (Figure 27).

Figure 27. Laboratory Referral Form for Poliomyelitis Investigation

Epidemiological number:_____ Hospital _____

Type of material (e.g., feces, blood) sent for investigation _____

Patient's name and surname _____

Address: _____

Date of birth /------/------/-----/

D M Y

If not known indicate age in months _____

Date of paralysis onset /------/-------/------/

Date the first stool sample was taken /------/-------/------/

Date the first stool sample was taken /------/-------/------/

Date the first sample was sent /------/-------/------/

Date the second sample was sent /------/-------/------/

Date of the last OPV vaccination /------/-------/------/

Preliminary clinical diagnosis_____(if specimen is taken from a contact, state so here)

Name of the person who carried out epidemiological investigation _____

Name of the person to whom laboratory test results should be sent _____

Address _____ Tel. Fax _____

This part should be filled in the laboratory

Date specimen received by the laboratory /------/-------/------/

Name of the person who received specimen_____

Is the specimen in good condition Yes No

c) Identify close and distant contacts of the case and check if they are properly vaccinated according to the immunization schedule to determine their susceptibility.

d) Collect a single stool sample from 5 close contacts of the AFP case who are under 5 years of age (e.g., brothers, sisters, playmates, classmates). Use the above recommendations and referral form for specimen transportation (as indicated in **b**).

e) Implement control and prevention measures.

- △ Unvaccinated or not fully vaccinated contacts under 15 years of age should be promptly immunized (however, the virus could have infected susceptible close contacts by the time the first case is recognized).
- △ The expert team may consider it necessary to immunize additional cohorts of children (e.g., 0- to 4-year-olds not covered during national immunization days in 2002).
- △ Patient's throat discharges, feces, and articles soiled therewith should be disinfected. In communities with modern and adequate sewage disposal systems, feces could be discharged into sewers without preliminary disinfection.

f) Monitor the case and follow up after 60 days of disease onset. Complete Section II of the AFP investigation card.

AFP Investigation Card (cont.)

SECTION II – EVALUATION AFTER 60 DAYS	
Date of investigation /------/-------/----------/	Epidemiological number
Patient's name and surname	Gender ○*Male* ○*Female*
Address	
Was patient's condition evaluated after 60 days?	○*Yes* ○*No*
If not , why? Date of patient's death /------/------/--------/ Patient lost out from supervision on (date) /------/------/--------/ Other reasons, specify_____	
If yes, does the paralysis still exist?	○*Yes* ○*No*
Date of evaluation	/------/------/--------/
Evaluator's name and surname	Signature
Evaluator's address	Telephone

i) Prepare and submit all relevant documentation for the National Expert Panel meeting. Include a copy of patient's medical record, completed Sections I and II of the epidemiological investigation card, laboratory test results, and control activity report. The Expert Panel will carry out the final case classification and complete the final section (III) of the investigation card.

AFP Investigation Card (cont.)

SECTION III – FINAL CASE CLASSIFICATION		
Date of investigation /------/-------/----------/	Country	Epidemiological number
Patient's name and surname		
Final polio case classification (check only one) ○*Confirmed* ○ *Compatible* ○ *Discarded*		
Basis for the case classification (check all that apply)	○ Isolation of poliovirus in stool sample ○ Poliovirus was not isolated from stool sample ○ Stool specimens were not investigated ○ Residual paralysis after 60 days ○ Patient died with symptoms of residual Polio ○ Autopsy results ○ Patient with residual polio symptoms lost to follow-up	
If poliomyelitis is confirmed indicate its type ○ Indigenous ○ Imported ○ Vaccine associated ○ Unknown		
If poliomyelitis is discarded, specify the final diagnosis		
Signature of the Expert Panel Head		

10.8.5 Routine Active Surveillance for AFP Cases

Active surveillance for AFP cases continues in order to completely eradicate poliomyelitis in the world. Surveillance measures include the following:

- Making weekly visits to hospitals and rehabilitation centers to refresh awareness of AFP registration
- Checking hospital and outpatient medical records for clinical signs of AFP
- Conducting seminars and meetings with neurologists, pediatricians, and physiotherapists concerning AFP diagnosis, registration, and investigation
- Conducting interviews with religious and community leaders, school teachers, social service workers, traditional healers, and others.

The CPH should carry out weekly active surveillance in medical facilities where AFP cases may occur. Surveillance results are recorded in the form shown in Figure 28. The form is sent monthly together with the monthly reports. One copy of the form should remain at the CPH.

10.8.6 Recommended Indicators for Evaluation of the AFP Surveillance Quality at the Regional Levels

Target

1. Annualized non-polio AFP rate per 100,000 children under 15 years of age ≥1/100,000
2. Percentage of all expected monthly reports that were received >90%
3. Percentage of AFP cases investigated within one business day of notification >90%
4. Percentage of AFP cases with two adequate* stool specimens collected 24 to 48 hours apart and ≤14 days of paralysis onset >80%
5. Percentage of specimens arriving at the laboratory in adequate condition >90%

* Note that specimens are adequate if two specimens were collected 24 to 48 hours apart and within 14 days of paralysis onset. The specimen arriving at the laboratory must be of adequate volume (8 to 10 grams), have appropriate documentation (i.e., laboratory request form), and be in "good condition." Good condition means no leakage, no desiccation, and evidence that the reverse cold chain was maintained (based on the presence of ice or temperature indicator).

10.8.7 Principle Uses of Data for Decision Making at the Regional and Rayon Levels

The regional- and rayon-level CPHs will use the data primarily to accomplish the following:

- Monitor routine OPV-3 and polio boosters coverage in geographic areas and focus corrective efforts in low-performing areas

- Identify high-risk areas, conduct Supplementary Immunization Activities (SIA) where appropriate
- Investigate clusters of AFP cases (if any) and consider SIA in consultation with NCDC
- Monitor performance of AFP surveillance using standard indicators listed above and focus efforts in low performing areas.

Figure 28. Weekly Surveillance Form for AFP

Active weekly surveillance of AFP

Form CD-4AFP

Health facility:				
Address: region---------- rayon ----------				
Reporting month, year ----------/ ----------				
	I week	**II week**	**III week**	**IV week**
Date of visit				
Period of time from the last visit				
* Signature of responsible person (chief doctor or head of the department)				
* Pediatric department (yes no)				
* Neurology department (yes no)				
* infectious department (yes no)				
No. of APF cases revealed during the visit				
Among them AFP cases which have not been notified				
Remarks:				
Name of investigator, Position				

Active weekly surveillance of AFP

Form CD-4AFP

Health facility:				
Address: region---------- rayon ----------				
Reporting month, year ----------/ ----------				
	I week	**II week**	**III week**	**IV week**
Date of visit				
Period of time from the last visit				
* Signature of responsible person (chief doctor or head of the department)				
* Pediatric department (yes no)				
* Neurology department (yes no)				
* Infectious department (yes no)				
No of APF cases revealed during the visit				
Among them AFP cases which have not been notified				
Remarks:				
Name of investigator, Position				

Note: both parts of the form should be filled. One copy is sent to NCDC by day 7 of the next month. One copy remain at CPH.

*Checking of registration journals and medical records, conversation with the clinicians

signature_____

signature_____

PROTOCOL FOR LABORATORY CONFORMATION OF POLIOMYELITIS

Sampling strategy: Collect specimens from every AFP and suspected polio case. Two specimens should be obtained within 14 days from the paralysis onset, with a 24-48 hour interval.

Confirmation test: Isolation of a poliovirus

Specimen to be collected: Stool

Referral laboratory: NCDC

Important: Stool samples must reach the laboratory within 2 to 3 days for testing.

I. DOCUMENTATION

Supplies needed:

- ○ Register 60/A
- ○ Marker (water resistant)
- ○ Lab investigation request form
- ○ Specimen label

Steps:

1. Create a specimen label with patient's name, identification number, date, and time.
2. Fill in a copy of a lab investigation request form (see next page) with patient information to accompany the specimen.
3. Make sure patient information has been entered in register 60/A and an urgent notification has been sent to CPH.

II. COLLECTION AND HANDLING

Supplies needed:

- ○ Sterile container
- ○ Wooden spatula, or plastic spoon
- ○ Viral transport medium

Steps:

1. Place a separate clean container with a wide opening (for example, a plastic ice-cream container), or plastic wrap, or newspaper in the toilet bowl. Pass feces directly into the container or onto the plastic wrap or newspaper. Do not contaminate the feces with urine.
2. Using a wooden spatula or plastic spoon, place enough feces (8-10g) to at least half fill the specimen container (e.g., penicillin vial).
3. Add 8–10 ml of VTM (Viral Transport Medium) to prevent drying if transport to laboratory is not immediate.
4. Screw the lid on the specimen container firmly.
5. Make sure the container is properly labeled (see Section I).
6. Place it in a sealed plastic bag.

III. STORAGE

Steps:

1. Immediately refrigerate at 4-8^{0}C.
2. Keep refrigerated until shipment.

IV. TRANSPORTATION

Supplies needed:

- ○ Ziplock plastic bag
- ○ Cold box with ice packs
- ○ Plastic container
- ○ Box Label

Steps:

1. Tighten the cap, apply waterproof sealing tape over the cap and top of specimen container.
2. Place specimen container in a suitably sized plastic bag (1st layer) together with a small amount of absorbent material, such as cotton wool. The bag must be sealed either using heated bag sealer or waterproof adhesive tape; as an alternative, use ziplock plastic bags. Specimens from different patients should never be sealed in the same bag.
3. Sealed bags containing the specimens should be placed inside plastic containers with screw-cap lids (2nd layer). Provided that specimens have been double-bagged properly in sealed plastic bags, specimens from several patients may be packed inside the same secondary plastic container. Additional absorbent material should be placed inside the container to absorb any leakage that may occur.
4. Sealed plastic containers should be fitted into insulated 3rd layer containers (e.g., a cold box). First, place ice packs at the bottom of the box, and, along the sides, place the plastic container with the specimen in the center, then place more ice packs on top. Make sure that the container is firmly fixed in the outer box.
5. Put the lab investigation request form in a plastic bag and place it in the outer box.
6. Label box with name, address, and telephone number of the referral laboratory and the sender.
7. Label box with the safety precautions ("Do not freeze," "Do not expose to heat," "This side up," "Biological specimen," etc.).
8. Arrange shipping date.
9. When arrangements are finalized, inform the recipient of time and manner of transport and make sure that package reaches referral laboratory within 2–3 days of specimen collection.

V. COMMUNICATING TEST RESULTS

Laboratory should communicate results to the clinician within 2 days of receiving the sample. If the result of the test is positive, it should also notify the rayon CPH.

Steps:

1. Record the results in the case history and Journal 60/A.

10.9 Rabies

10.9.1 Rationale for Surveillance

Rabies is a fatal zoonotic viral disease, transmitted to humans through contact (mainly bites and scratches) with infected animals. Infected animals can be both domestic and wild, including dogs (the principal reservoir), cats, foxes, wolves, jackals, raccoons, and mongooses. The period of communicability before onset of clinical signs in these animals is usually 3-7 days.

Transmission from person to person is theoretically possible, but has never been documented.

Eleven (11) rabies deaths were registered in Georgia in 2003. Almost all cases had not sought medical care and subsequently did not receive post-exposure prophylaxis. Rabies mortality rate is 0.25 per 100,000 population; the case-fatality rate is 100 percent. Each year on average 15,000 people[24] in Georgia need to receive post-exposure treatment after being exposed to animals suspected of carrying rabies.

Surveillance of both human and animal rabies is essential to detect high-risk areas and outbreaks quickly, and to monitor the use of vaccine.

Major strategies for combating human rabies promoted in these recommendations include:

1. Prevention of human rabies through well-targeted post-exposure treatment and increased availability of rabies vaccine

2. Disease elimination through mass vaccination of dogs and other animals as well as stray animal control.

10.9.2 Recommended Case Definition

Clinical description of human rabies: an acute encephalitis dominated by forms of hyperactivity or paralytic syndromes that progresses towards coma and death (usually by respiratory failure), within 7 to 10 days after the first symptom if no intensive care is instituted. Bites or scratches from a suspected animal can usually be tracked back in the patient medical history. The incubation period may vary from days to years and more but usually falls between 30 and 90 days.

Human rabies case classification

- ***Clinical (probable)****:* A case that meets the clinical description of rabies.
- ***Confirmed***: A clinically compatible case with at least one of the following:
  - Detection of rabies viral antigens by direct fluorescent antibody (FA) in clinical specimens, preferably brain tissue (collected post mortem)
  - Isolation of rabies virus from clinical specimens collected ante mortem (e.g., skin or cornea smear) and confirmation of rabies viral antigens by direct fluorescent antibody testing

[24] WHO estimates that approximately 250 people receive rabies post-exposure prophylaxis per one human rabies death; according to Georgia statistics, 1,348 post-exposure prophylaxis correspond to one human rabies case.

- Detectable rabies-neutralizing antibody titer in the cerebral spinal fluid (CSF) of an unvaccinated person
- Identification of viral antigens by PCR on fixed tissue collected post mortem or in a clinical specimen (brain tissue, skin, cornea, saliva)
- Bio-test: Mice inoculation with infected brain extract and one-month follow-up.

Human exposure to rabies that requires post-exposure prophylaxis

- A person who had close contact (bite, scratch, exposure to saliva) with a any animal in a rabies infected area.[25]

Rabies confirmed in euthanized animal:

- Detection of rabies viral antigens by direct fluorescent method in brain tissue
- Bio-test: Mice inoculation with infected brain extract and one-month follow-up

The degree of exposure is taken into account when administering post-exposure prophylaxis (see Chapter 6).

Laboratory testing is currently mandated for every clinical (probable) case of rabies in animal and humans. At present the only method – detection of rabies viral antigens by direct FA is performed. The regional CPH or NCDC can be contacted to arrange sample transportation to the National Center of Veterinary Expertise and Diagnostics, Tbilisi, Godziashvili Str.#65.

10.9.3 Case Notification Procedures and Forms

Any clinical (probable) or confirmed case of human rabies identified by providers or laboratories, as well as any human exposure to rabies (definite or probable), requires urgent notification of the CPH as soon as possible but not later than within 24 hours by any existing means of communication. If the notification is made by phone, there is no need to send an urgent notification card.

10.9.4 Human Rabies Exposure/Rabies Case/Death Investigation

Investigation is aimed at identifying sources of infection as well as humans exposed, in order to accurately assess the risk of infection and appropriately manage the exposure. Rapid exchange of information with services in charge of animal rabies surveillance and control is required to streamline implementation of other general rabies prevention measures.

Investigation is carried out

1. Individuals with a history of rabid (clinical or laboratory-confirmed) animal contact should be investigated at once. They should be treated as an emergency
2. In rabies-infected areas when group cases occur (exposure of more than one individual to the same animal)

[25] "Rabies infected area" is a geographical area where confirmed animal and/or human rabies cases have been registered in the past five years. The entire territory of Georgia is regarded as a "rabies infected area."

3. In the human rabies area

Steps of an investigation:

a) Verify that all cases meet the clinical description of human rabies.

b) Collect data as envisioned in the rabies investigation card (see Figure 29).

c) Identify the source of infection, euthanize the animal, and collect specimens for lab testing as appropriate (see Chapter 5, points 5 and 6).

d) Identify all other exposed humans through review of health records and interviews with health workers and community members.

e) Ensure urgent post-exposure prophylaxis for all persons with animal exposure (bites, scratches, exposure to saliva) (more details are provided in Chapter 6).

f) Implement general rabies prevention measures as outlined in Chapter 5.

g) Institute appropriate control of rabies patient and contacts (see Chapter 7).

h) Write a report which includes rabies investigation card (Figure 29) and send it to the regional CPH in two copies (the region CPH will forward one copy to NCDC).

i) Inform local health administration and other stakeholders about rabies cases and human exposure trends verbally or in a written form. Inter-sectoral cooperation of medical and veterinary services, and community involvement and participation are required for targeted response and control in animal reservoirs.

Figure 29. Rabies Exposure/Rabies Case Investigation Card

Registration # Month _____ Facility _____ Rayon_____

#	Data	Patient #1	Patient #2
	Name		
1.	Age		
2.	EpidNumber		
3.	City, rayon, address		
4.	Occupation		
5.	Date(s) of bite/scratch/exposure to saliva?	Day/ /month / /year / /	Day/ /month / /year / /
6.	Geographical location of biting episode		
7.	Group case?	Yes No	Yes No
8.	Type of biting animal		
9.	Site of bite on the body		
10.	Nature (circumstances) of bite		
11.	Animal samples taken?	Yes No	Yes No
12.	Animal sample results		
13.	Hospitalized when, where?	Day/ /month / /Year / / Hospital_____	Day/ /month / /Year / / Hospital_____
14.	Local wound treatment provided? If yes by whom and what type?		
15.	RIG given? If yes, when and what amount? Indicate lot number and expiration date.	/ / / /_____ units Day month year	/ / / / _____units Day month year
16.	Rabies vaccine given? If yes, indicate dates of doses, lot numbers and expiration datse	Y/N	Y/N
17.	Outcome		
18.	Date of onset of symptoms? (for cases/deaths only)	Day/ /month / /year / /	Day/ /month / /year / /
19.	Lab samples taken? (for cases/deaths only)	Yes No	Yes No
20.	Lab sample results (for cases/deaths only)		

Responsible Person_____ Signature_____

Name Tel: _____ Address, fax, E-mail_____

The card should be submitted to the region CPH before day 5 and to NCDC (Tbilisi, 380077, st. M. Asatiani #9, Tel. 37-16-77.39-64-38) before day 7 of the next month **for each human rabies case or human rabies exposure.**

10.9.5 Rabies Prevention Measures

Rabies prevention includes a number of measures provided by communal, veterinary and health care services.

1) Register, license, and immunize all dogs. Immunize all cats.

2) Collect ownerless animals and strays, vaccinate them and regulate their reproduction using modern methods to reduce their threat to the population, and euthanize if required.

3) **Educate the public and pet owners about the following list**:

- ✓ Pets such as dogs and cats must be immunized.
- ✓ Other domestic animals should be immunized in rabies-infected areas.
- ✓ Strange-acting or sick animals of any species, domestic or wild, may be dangerous and should not be picked up or handled.
- ✓ It is necessary to report such animals and animals that have bitten a person to the local health department.
- ✓ Children should be cautioned against provoking or attempting to capture stray or wild animals and against touching carcasses.
- ✓ Wild animals should not be kept as pets.
- ✓ Pets must be leashed in congested areas when not confined on owner's premises.

4) **Develop/maintain laboratory capacity to perform FA testing on all wild animals involved in human or domestic animal exposures and all domestic animals clinically suspected of having rabies**.

5) Educate physicians, veterinarians and animal control officials to obtain/euthanize/test[26] animals involved in human and domestic exposures

6) Detain and clinically observe for 10 days any healthy-appearing dog or cat known to have bitten a person (unwanted dogs may be euthanized immediately and examined for rabies by fluorescent microscopy). Dogs and cats showing suspicious signs of rabies[27] should be sacrificed[26] and tested for rabies. All wild mammals that have bitten a person should be sacrificed[26] immediately and the brain examined for evidence of rabies.

7) Euthanize immediately non-immunized dogs or cats bitten by known rabid animals.

8) Individuals at high risk (e.g., veterinarians, animal control and wildlife workers, laboratory and field personnel working with rabies, hunters) should receive pre-exposure immunization given in 1 ml doses by IM injection on days 0, 7, and 30 and a booster dose one year later. If risk of exposure continues, either additional single booster doses are given, or preferably serum is tested for neutralizing antibody every three years, with booster doses given when indicated.

[26] The intact heads, packed in ice (not frozen), of animals that die of (or that have been euthanized due to) suspected rabies should be submitted immediately to a laboratory for viral antigen testing by FA staining, or, if this is not available, by microscopic examination for Negri bodies, followed by mouse inoculation.

[27] If the biting animal was infective at the time of the bite, signs of rabies will usually follow within 4 to 7 days, with a change in behavior and excitability or paralysis, followed by death.

9) Individuals who previously received full course of pre- or post-exposure prophylaxis, which was completed within the past year, should receive 3 doses of the vaccine – 1 ml on days 0, 3, and 7. If the period after completion of the prophylaxis exceeds one year, the person should receive vaccination and RIG according to the ordinary scheme. See Chapter 6.

10.9.6 Post-exposure Prophylaxis of Rabies after Animal Bites/Scratches or Contact with Saliva

1) **Treatment of bite wound:** The most effective rabies prevention is immediate and thorough cleaning with soap or detergent and flushing with water all wounds caused by an animal bite or scratch. The wound should not be sutured unless unavoidable for cosmetic or tissue-support reasons. Sutures, if required, should be placed after local infiltration of antiserum. They should be loose and not interfere with free bleeding and drainage.

Checklist for treatment of animal bites:
1. Clean and flush the wound immediately (first aid)
2. Thorough wound cleansing
3. Rabies immune globulin and/or vaccine
4. Tetanus prophylaxis and antibacterial treatment when required
5. No sutures or wound closure advised

2) **Specific immunologic protection** is provided by administration of rabies immune globuline (RIG) as soon as possible after exposure to neutralize the virus at the bite wound site, and then by giving vaccine at a different site to elicit active immunity.

- ***Human RIG*** should be used in a single dose of ***20 IU/kg***; with half the dose infiltrated into and around the bite wound if possible, and the rest given IM. ***If serum or animal origin is used***, an intra-dermal or subcutaneous test dose should precede its administration to detect allergic sensitivity, and the dose should be increased to a total of ***40 IU/kg***. Both serums should be administered according to the attached instruction.
- ***Rabies vaccine***[28] is given in the deltoid region in accordance with the instruction on vaccine use (see scheme below). The first dose is administered as soon as possible after the bite (at the same time as the single dose of RIG is given).

RIG and rabies vaccines should be available in all rayon and regional hospitals.

If neither RIG nor rabies vaccine is immediately available, health workers must refer the patient to the nearest rayon hospital.

[28] Immunization with rabies vaccine carriers a very small risk of post-immunization encephalitis. No cases have been reported in Georgia so far.
Local reactions, such as pain, erythema, swelling or itching at the injection site, have been reported in 25percent of those receiving 1.0 ml doses. They are usually successfully managed with anti-inflammatory and antipyretic agents such as ibuprofen and acetaminophen.
Special situations: The vaccine can be safely given to pregnant women. Persons with immuno-suppression should receive the vaccine for post-exposure prophylaxis, too. Persons with a history of serious hypersensitivity to rabies vaccine should get post-exposure vaccination after administration of antihistamines. Adrenaline preparations should be readily available to counteract anaphylactic reactions.

Table 14 is a general guide to prophylaxis in various circumstances according to the instruction of most frequently used vaccine and immunoglobulin in Georgia (produced in the Russian Federation and approved by Chief Sanitary doctor on 12. 03. 2003):

Table 14. Guide to Rabies Prophylaxis

	Type of exposure	Information about animal	Post-exposure prophylaxis
1	No skin lesion, no exposure to saliva, no direct contact*	Rabid animal**	No treatment
2	Exposure to saliva of uninjured skin; single superficial scratch or bite on the body, hands, or legs (except for head, face, palm, fingers, toes, and genital area) by a domestic animal.	If after 10 days of supervision the animal remains healthy, interrupt treatment (after giving 3 doses of vaccine). In other cases (animal died, disappeared, euthanized), treatment should be continued with the recommended scheme.	Treatment is started immediately. Rabies vaccine is given in 1-ml doses on days 0, 3, 7, 14, 30, 90.
3	Any exposure of mucous to saliva; any scratch or bite on hand, face, neck, palm, fingers, toes, and genital area. Multiple bites and massive injuries (single deep bites and scratches) of any localization by domestic animals. Any exposure to saliva, any skin lesion from contact with wild animals (rodents, bats, etc.)	If 10 days of supervision is possible and after 10 days the animal remains healthy, interrupt treatment (after 3 doses of vaccine). In other cases (animal died, disappeared, euthanized), treatment should be continued with the proposed scheme	Combined treatment is started immediately with RIG on day 0 and rabies vaccine (1ml) on days 0, 3, 7, 14, 30, 90.

* "Contact" is considered exposure to saliva, scratches, abrasion, bites.

** If animal exhibits clinical signs of rabies (change of behavior, aggressiveness, excitability, dilated pupils, tremors or paralysis, salivation), it should be euthanized immediately and tested. If immunofluorescence test results of the animal are negative, a biotest (mice inoculation) should be performed, and in the case of a negative result, vaccination should be discontinued.

Note: Vaccines and immunoglobulines produced by other manufacturers should be always administered in accordance with respective instructions.

10.9.7 Control of Rabies Patient and Patients' Contacts

1) Contact isolation of rabies patient for respiratory secretions for the duration of the illness.

2) Concurrent disinfection of saliva and articles soiled thereof. Although transmission from a patient to attending personnel has not been documented, immediate attendants should be warned of the potential hazard of infection from saliva, and should wear rubber gloves, protective gowns, and protection to avoid exposure from a patient coughing saliva in the attendant's face.

3) Contacts who have an open wound or mucous membrane exposure to the patient's saliva should receive anti-rabies specific treatment (see Chapter 6).

10.9.8 Monitoring of Rabies Occurrence and Anti-rabies Activities at the Rayon Level

The rayon CPH should prepare an anti-rabies activity report (form CD-4) on a monthly basis and send two copies to the regional CPH along with monthly reports (see Figure 30)

Figure 30. Anti-rabies Activity Report

<table>
<tr><td>Vaccine supply (sets)</td><td colspan="6">at the beginning of current month</td><td colspan="2">No. of anti-rabies cabinets functioning</td><td></td></tr>
<tr><td>Immunoglobulin supply (ampoules)</td><td colspan="6">at the beginning of current month</td><td colspan="2">Rabies confirmed in animals</td><td>No.</td></tr>
<tr><td rowspan="12">Number of injured individuals by age, animal, health condition</td><td rowspan="6">Total</td><td rowspan="6">Injured by owned animals
(of total)</td><td rowspan="6">Number of injured individuals by type of animal</td><td>by dogs</td><td></td><td rowspan="2">dogs</td><td>clinically</td><td></td></tr>
<tr><td>lab.</td><td></td></tr>
<tr><td>by cats</td><td></td><td rowspan="2">cats</td><td>clinically</td><td></td></tr>
<tr><td>lab.</td><td></td></tr>
<tr><td>other (indicate)</td><td></td><td rowspan="2">other (indicate)</td><td>clinically</td><td></td></tr>
<tr><td>lab.</td><td></td></tr>
<tr><td rowspan="6">Of total, no. under 15 years</td><td rowspan="6">Injured by ownerless animals
(of total)</td><td rowspan="6">Number of injured individuals by type of animal</td><td>by dogs</td><td></td><td rowspan="2">dogs</td><td>clinically</td><td></td></tr>
<tr><td>lab.</td><td></td></tr>
<tr><td>by cats</td><td></td><td rowspan="2">cats</td><td>clinically</td><td></td></tr>
<tr><td>lab.</td><td></td></tr>
<tr><td>other (indicate)</td><td></td><td rowspan="2">other (indicate)</td><td>clinically</td><td></td></tr>
<tr><td>lab.</td><td></td></tr>
<tr><td rowspan="8">Veterinary supervision during 10 days</td><td colspan="3">Supervision of dog completed</td><td rowspan="8">Results</td><td>alive</td><td></td></tr>
<tr><td colspan="2">Total</td><td>Among them vaccinated</td><td>died</td><td></td></tr>
<tr><td colspan="2"></td><td></td><td>euthanized</td><td></td></tr>
<tr><td colspan="3">Supervision of cat completed</td><td>lost</td><td></td></tr>
<tr><td colspan="2">Total</td><td>Among them vaccinated</td><td>alive</td><td></td></tr>
<tr><td colspan="2"></td><td></td><td>died</td><td></td></tr>
<tr><td colspan="3"></td><td>euthanized</td><td></td></tr>
<tr><td colspan="3"></td><td>lost</td><td></td></tr>
<tr><td colspan="3" rowspan="3">No. of vaccinated individuals</td><td rowspan="3"></td><td>Among them fully immunized</td><td colspan="2"></td></tr>
<tr><td>Not completed</td><td colspan="2"></td></tr>
<tr><td>Interrupted</td><td colspan="2"></td></tr>
<tr><td rowspan="2">Immunoglobulin used</td><td>No. of ampoules</td><td></td><td colspan="2" rowspan="2">No. of individuals to whom immunoglobulin was administered</td><td colspan="2" rowspan="2"></td></tr>
<tr><td>IU</td><td></td></tr>
</table>

10.9.9 Recommended Scope of Data Analysis at Rayon and Regional Levels

The CPH should perform routine monthly analysis of the following data:

1. Human exposure by:
    - geographical area
    - dates of biting/scratch episode
    - type/species of animal
    - by outcome in human and animal populations
2. Cases by:
    - geographical area
    - dates of biting/scratch episode
    - type of animal
    - occupation
    - outcome

10.9.10 Principle Uses of Data for Decision Making at Rayon and Regional Levels

Rayon- and regional-level CPHs will use the data primarily to accomplish the following:

1. Detect outbreaks in endemic areas and new cases in rabies-free areas
2. Determine high-risk areas and population groups for intervention

Based on the above, local authorities should:

1. Estimate the amount of rabies vaccines and RIG needed to keep in stock.
2. Evaluate effectiveness of intervention at the level of the animal reservoir and exposed human population
3. Control the number of ownerless animals
4. Plan additional interventions

10.10 Shigellosis

10.10.1 Rationale for Surveillance

The genus *Shigella* is comprised of 4 serogroups: *S. dysenteriae* (Group A), *S. flexneri* (Group B), *S. boydii* (Group C) and *S. sonnei* (Group D), which are further subdivided into a number of serotypes.

S. sonnei accounts for over 60 percent of the shigellosis in Georgia. *S. flexneri* accounts for almost all of the rest. Other types of shigella are rare in the country.

Outbreaks may be food-borne or water-borne. Shigella can also be transmitted by flies. In many cases, a small inoculum (10 to 200 organisms) is sufficient to cause infection. As a result, spread can easily occur by the fecal-oral route, particularly in areas with disrupted access to safe drinking water supply, malfunctioning sewage systems, or where hygiene is poor.

The severity of illness and the likelihood of a fatal outcome depend on the age and preexisting nutritional state of the host and the serotype of the bacteria.

- *Shigella dysenteria type 1* is often associated with serious disease and severe complications that include toxic megacolon and the hemolytic-uremic syndrome that may result in case-fatality rates as high as 15 percent.
- Certain strains of *S. Flexneri* can cause a reactive arthropathy (Reiter syndrome), especially in persons who are genetically predisposed by having the HLA-B27 antigen. The Reiter's syndrome can last for years, and can lead to chronic arthritis.
- In contrast, many infections with *S. Sonnei* and *boydii* result in a short clinical course and an almost negligible case-fatality rate.
- Convulsions may occur in small children due to a rapid rise in temperature or metabolic alterations.

Approximately 150 laboratory-confirmed cases of shigellosis and 300 total reported cases occur in Georgia each year. Because many milder cases are not diagnosed or reported, the actual number of infections may be up to 20 times greater. No deaths have been reported in the past 5 years.

The objective of shigellosis surveillance is to promptly investigate outbreaks to determine the mechanism of transmission, identify high-risk groups in the population and institute appropriate control measures.

Main strategies to prevent and control outbreaks of shigellosis include the following:

- Health education to modify hygiene and hand-washing behavior of the population;
- Sanitary control of food preparers and handlers who can resume work only after they have been shown to no longer be carrying the *Shigella* bacterium.
- Ensuring safety of municipal drinking water supply and appropriate treatment of sewage
- Improvements in hygiene for vegetable and fruit picking and packing

10.10.2 Recommended Shigellosis Case Definition

Clinical description: Any person with frequent (three or more times a day) and painful passage of stools that have visual presence of blood, mucus or pus, accompanied by fever and stomach cramps.

***Note*:** Asymptomatic infections may occur.

Case classification

- ***Clinical (probable):*** not applicable
- ***Confirmed***:
  - ***Laboratory-confirmed shigellosis:*** A case that meets the clinical description of shigellosis that is laboratory confirmed (isolation of *Shigella* from a stool specimen)
  - ***Epidemiologically confirmed:*** A case that meets the clinical description of shigellosis and who was exposed to the same source of infection as a laboratory-confirmed case

Laboratory testing is currently mandated for every hospitalized case of a diarrheal disease and for confirmation of outbreaks when there is a clustering of three or more cases of clinical diarrhea. The regional CPH can be contacted to obtain the most current list of NCDC recognized/recommended laboratories in the area. Isolation of *S. dysenteria type 1* must be confirmed by the NCDC.

The protocol for laboratory confirmation is given at the end of this section (10.10).

10.10.3 Shigellosis Case Notification Procedures and Forms.

Any case of acute diarrhea meeting the clinical description of shigellosis and any confirmed case of shigellosis identified by providers or isolation of *Shigella* by any laboratory requires urgent notification of the CPH within 24 hours by any existing means of communication. General requirements for notification are outlined in more detail in Chapter 4.

Health service providers should report any cases of acute diarrhea meeting the clinical description of shigellosis to the rayon CPH as “Diarrhea” specifying in brackets (Suspected Shigellosis) on urgent case notifications.

During subsequent investigation, the rayon CPH will classify such cases as “Confirmed Shigellosis” or “Unspecified Infectious Diarrheal Disease” and report them accordingly, taking into account results of laboratory tests and investigation findings.

10.10.3 Shigellosis Outbreak Investigation

Rapid identification and investigation of confirmed shigellosis and acute diarrhea cases meeting the clinical description of shigellosis is important for the source and the mechanism of transmission to be identified and measures taken to prevent further spread to other persons.

Note: A cluster of 3 cases of acute diarrhea or confirmed cases of shigellosis during 2 weeks in a given geographic territory requires an investigation by a rayon CPH epidemiologist in cooperation with facility health workers within 2 business days of notification.

The following steps are recommended in an investigation (see also Chapter 6):

a) ***Verify that all cases meet the clinical description of shigellosis by reviewing medical records***

b) ***Collect laboratory specimens if this has not been done yet*** (refer to the protocol at the end of this chapter). In case of a large outbreak try to obtain specimens from at least 10-20 people.

c) ***Collect data as envisioned in an cluster/outbreak investigation report for diarrheal diseases*** (see suggested template in Figure 31 for Diarrheal Disease Investigation Report). If a food-borne shigellosis is suspected, complete also an annex report about food-borne bacterial intoxication (see Figure 32a)

d) Inform local health administration and other stakeholders about outbreak/group cases verbally or in a written form (e.g., share with them preliminary investigation results)

e) Implement control and prevention measures regardless of whether laboratory confirmation of shigellosis is already available (see next section).

f) Continue analyzing the data about the outbreak as described in the general part of the guidelines on a daily basis as new information on the outbreak becomes available. The objective is to monitor the effectiveness of control measures.

g) Finalize the cluster investigation report (Figure 31) and annex (in case of food-borne shigellosis, see Figure 32a) and submit them to the regional CPH in two copies (the regional CPH will forward one copy to NCDC).

10.10.4 Shigellosis Outbreak Control/Response

A cluster of 3 or more cases is considered an outbreak and requires the following control actions from the health facility and rayon CPH:

1. If the cause of the outbreak has been identified (such as disrupted drinking water supply, malfunctioning sewage systems), advise local health administration, sanitary inspection and other appropriate authorities on the need to fix the problem immediately.

2. Advise patients on the importance and effectiveness of hand-washing with soap and water after defecation as a means of curtailing transmission of *Shigella* to contacts.

3. Patients with known *Shigella* infections (and, whenever feasible, ill contacts of shigellosis patients) should not be employed to handle food or to provide child or patient care until 2 successive fecal samples or rectal swabs (collected 24 or more hours apart, but not sooner than 48 hours following discontinuance of antimicrobials) are found to be free of *Shigella*.

4. Carry out concurrent disinfection of feces and contaminated articles with a chlorine solution or any other MoHLSA-recommended disinfectants. In communities with a modern and adequate sewage system, feces can be discharged directly into sewers without preliminary disinfection.

5. Recommend keeping small children with diarrhea out of child care settings

6. Deliver appropriate health education messages to the population (some examples are provided below) taking into account local traditions and cultural sensitivities targeting first of all mothers, schoolchildren and street vendors. An organized effort to promote careful hand-washing with

soap and water is the single most important control measure to decrease transmission rates in most settings.

PERSONAL HYGIENE

- ✓ Wash your hands, including under the nails with soap using plenty of clean water
  - before you prepare or serve food;
  - before you eat or feed children;
  - after you use the toilet or clean up children
- ✓ Use a toilet or latrine and keep them clean
- ✓ Dispose of babies' feces in the toilet or latrine
- ✓ Supervise hand washing of small children after they use the toilet

FOOD

- ✓ Cook raw food thoroughly
- ✓ Eat cooked food while it is still hot
- ✓ Store leftover cooked food in a refrigerator
- ✓ Reheat cooked food thoroughly
- ✓ Avoid contact between raw and cooked food
- ✓ Eat raw fruit only after it has been freshly peeled
- ✓ Wash your dishes, utensils, and especially cutting board with soap and water

DRINKING WATER

- ✓ Boil or chlorinate your drinking water
- ✓ Store drinking water in a clean container with a small opening or a cover away from small children
- ✓ Cover open wells when not in use
- ✓ Hang up the buckets used to collect water when not in use – do not leave them on a dirty surface
- ✓ Pour the water from the container, do not dip a cup into it
- ✓ Do not defecate in or near a source of drinking water

7. If the access to clean water supply is disrupted, provide needed supplies and educate health workers and the population that water for drinking can be made safe in two ways:

- By boiling it
- By chlorinating it. For this purpose, first prepare a stock solution of chlorine by adding to 1 liter of water one of the following:

  - ✓ 15 grams of 70% calcium hypochlorite **or**
  - ✓ 33 grams of chlorinated lime at 30% active chlorine **or**
  - ✓ 250 ml of 5% sodium hypochlorite (**or** 120 ml of 10% sodium hypochlorite)

Store the stock solution in a cool place in a closed container that does not admit light.
Then ***use the stock solution to make water safe*** by adding three drops (or 0.6 ml) of the stock solution to each liter of water. Mix well and allow the chlorinated water to stand for at least 30 minutes before using it.

10.10.5 Recommended Scope of Routine Analysis of Shigellosis Surveillance Data to Be Performed by CPH

(See Chapter 5 for more details.)

The CPH should perform routine monthly analysis of the following data:

- Shigellosis incidence rate / number of cases by month, year, age group and geographic area (line graphs can facilitate observing seasonal and secular trends)

- Laboratory testing and confirmation rates for diarrheal diseases
- Urgent notification and outbreak investigation rates

10.10.6 Principle Uses of Data for Decision Making at the Regional and Rayon Levels

The regional- and rayon-level CPHs will use the data primarily to accomplish the following:

- Monitor trends in disease incidence
- Detect and monitor outbreaks and epidemics for appropriate response
- Identify high-risk areas for further targeting of intervention
- Determine the effectiveness of control measures
- Help mobilize additional funds to support outbreak control measures
- Evaluate and improve the performance of the surveillance system (e.g., reaction time for notification, case confirmation rate, outbreak investigation rate)

Figure 31. Suggested Template: Investigation Report for Cluster of Diarrheal Disease

Introduction:

1. General context, description of the affected territory: accessibility of the area, type of setting(s) involved (e.g., school, hospital), condition of the sewage and drinking water supply systems, etc.

Investigation findings:

2. Date outbreak started, that is, the date of onset of the first case
3. Number of individuals affected by the outbreak – no. of cases, no. of deaths, case fatality rate
4. Epidemic curve: distribution of cases per day or per week since the beginning
5. Geographical distribution of cases: attach maps as necessary
6. Age, gender and social distribution of cases
7. Attack rates[1] for specific food items eaten and not eaten (if applicable)
8. Results of laboratory investigation of cases: organism isolated and its antimicrobial susceptibility patterns
9. Results of laboratory investigation of the environment (if applicable)
10. Partners operating locally in the domain of water/sanitation and health care

Discussion:

11. Confirmed or probable source of infection
12. Confirmed or probable mode of transmission
13. Risk of spread of the outbreak and potential consequences
14. Conditions that support spread of the disease
15. Potential limitations of the field investigation (areas not visited, quality of data collected, etc.)

Actions taken and recommendations:

16. List response and preventive measures taken
17. Give clear practical recommendations regarding additional control measures to be undertaken
18. Provide advice on the need for additional resources (human, material, financial) to help control the outbreak and coordination with other partners operating in this domain.

[1] Attack rate is the proportion of an exposed population at risk that becomes infected or develops clinical illness during a defined period of time.

PROTOCOL FOR LABORATORY CONFiRMATION OF SHIGELLOSIS and SALMONELLOSIS

Sampling strategy: Collect specimens from up to 10-20 clinical cases at each investigation site. Cases should meet all of the following criteria:
currently having bloody diarroea or probable salmonellosis; b) onset of illness less than 4 days before sampling;

Confirmation test: Isolation of Shigella or Salmonella

Specimen to be collected: Stool

Referral laboratory: Contact regional CPH office or NCDC for the list of approved laboratories

Important: Stool samples should reach the laboratory within 48 hours of collection

I. DOCUMENTATION

Supplies needed:

- ○ Register 60/A
- ○ Marker (water resistant)
- ○ Lab investigation request form
- ○ Specimen label

Steps:

1. Create a specimen label with patient's name, identification number, date, time and suspected diagnosis
2. Fill in a copy of a lab investigation request form with patient information to accompany the specimen.
3. Make sure patient information has been entered in register 60/A and an urgent notification has been sent to CPH.

II. COLLECTION AND HANDLING

Supplies needed:

- ○ One tube of Cary Blair transport medium
- ○ Gloves
- ○ Leak-proof screw-cap container
- ○ Adhesive tape
- ○ Sterile cotton-tipped applicators (swabs)

If specimen can not reach the laboratory within 2 hours, Cary Blair transport medium should be used.

Steps:

1. If possible, chill the tube of Cary Blair medium by placing it in on ice packs in a refrigerator 1-2 hours before collecting the specimen
2. Put on gloves & wear them at all times when handling the specimen
3. Using a wooden spatula or plastic spoon, collect fresh stool (8-10g) including portions with blood and/or mucus. Place stool in a leak-proof sterile screw-cap container. Do not let stool dry out.
4. If a patient is not able to pass stool, take a rectal swab as follows:
5. Remove the wrapper from the handle end of the sterile swab. Do not touch the tip of the swab
6. Moisten the swab in chilled Cary Blair medium
7. Insert the swab through the rectal sphincter 2-3 cm and gently rotate
8. Withdraw and examine the swab to make sure fecal material is visible on the tip
9. Transfer a small amount of the stool (or the rectal swab) to the bottom a tube of Cary Blair transport medium.
10. Break off the top portion of the stick so the cap can be tighly screwed onto the tube.
11. Make sure the tube is properly labeled (see Section I).
12. Safely dispose of all contaminated materials. Do not reuse.

III. STORAGE

Steps:

1. Immediately refrigerate at 4-8^{0}C.
2. 2. Keep refrigerated until shipment.

IV. TRANSPORTATION

Supplies needed:

- ○ Ziplock plastic bag
- ○ Cold box with ice packs
- ○ Plastic container
- ○ Box label

Steps:

If the laboratory is nearby, specimens may be hand carried in an insulated box with ice packs, otherwise follow the following procedures:

1. Tighten the cap, apply waterproof sealing tape over the cap and top of specimen container.
2. Place specimen container in a suitably sized plastic bag (1st layer) together with a small amount of absorbent material, such as cotton wool. The bag must be sealed either using heated bag sealer or waterproof adhesive tape; as an alternative, use ziplock plastic bags. Specimens from different patients should never be sealed in the same bag.
3. Sealed bags containing the specimens should be placed inside plastic containers with screw-cap lids (2nd layer). Provided that specimens have been double-bagged properly in sealed plastic bags, specimens from several patients may be packed inside the same secondary plastic container. Additional absorbent material should be placed inside the container to absorb any leakage that may occur.
4. Sealed plastic containers should be fitted into insulated 3rd layer containers (e.g., a cold box). First, place ice packs at the bottom of the box, and, along the sides, place the plastic container with the specimen in the center, then place more ice packs on top. Make sure that the container is firmly fixed in the outer box.
5. Put the lab investigation request form in a plastic bag and place it in the outer box.
6. Label box with name, address, and telephone number of the referral laboratory and the sender.
7. Label box with the safety precautions ("Do not freeze," "Do not expose to heat," "This side up," "Biological specimen," etc.).
8. Arrange shipping date.
9. When arrangements are finalized, inform the recipient of time and manner of transport and make sure that package reaches referral laboratory within 2 days of specimen collection.

V. COMMUNICATING TEST RESULTS

Laboratory should communicate results to the clinician within 2-4 days of receiving the sample. If the result of the test is positive, it should also notify the rayon CPH.

Steps: 1. Record the results in the case history and Journal 60/A.

10.11 Salmonellosis[29]

10.11.1 Rationale for Surveillance

Salmonellosis is the main cause of food-borne disease. The predominant mode of transmission is ingestion of the organisms in food derived from infected animals or contaminated by feces or an infected animal or person. This includes raw and undercooked eggs and egg products, raw milk and raw milk products, contaminated water, meat and meat products, poultry and poultry products.

Most cases occur sporadically. However, large outbreaks in hospitals, institutions for children, and restaurants are not uncommon and usually arise from food contaminated at its source, or less often, during handling by an ill person or a carrier.

NCDC receives reports about approximately 200 culture-confirmed cases every year for an average rate of 4.5 per 100,000 people. However, most *Salmonella* infections are mild and self-limited and only a small proportion of all cases (1-2 percent) are recognized clinically and reported. The severity of illness depends on the serotype, number of organisms ingested and host factors. Infants, the elderly and those with impaired immune system are more likely to have a severe illness requiring hospitalization. Case fatality rate is approximately 0.2 percent with most deaths occurring in people with *Salmonella* sepsis or severe dehydration. 2 percent of cases are complicated by chronic arthritis.

In addition to the above health-related complications, salmonella food poisoning is costly for the patient (loss of wages and cost of treatment), for the health and social services (cost of treatment, investigation, sick leave benefits) and for the food industry (loss of production, bad publicity, possible litigation).

The purpose of reporting and surveillance

- To identify the source of transmission (e.g., a commercial product or a food handler) and to prevent further disease transmission
- To inform population how they can reduce their risk of exposure
- To educate potentially exposed people about the signs and symptoms of disease to facilitate early diagnosis

10.11.2 Recommended Salmonellosis Case Definition

Clinical description: Any person with diarrhea, fever > 37^0C, abdominal pain, nausea with or without vomiting.

***Note*:** Asymptomatic infections may occur and the organism may cause extraintestinal infections.

Case classification

- ***Clinical (probable)****:* not applicable

[29] In the present guidelines, the term "salmonellosis" is used to define the clinically manifest disease of people and animals resulting from infection by *Salmonella* other than *Salm. typhi* or *Salm. paratyphi A, B, or C*.

- ***Confirmed:***
  - ***Laboratory-confirmed:*** A case that meets the clinical description of salmonellosis that is laboratory confirmed (isolation of *Salmonella* from a clinical specimen)
  - ***Epidemiologically confirmed:*** A case that meets the clinical description of salmonellosis and who was exposed to the same source of infection as a laboratory-confirmed case

Laboratory testing is currently mandated for every hospitalized case of a diarrheal disease and for confirmation of outbreaks when there is a clustering of three or more cases of diarrhea. The regional CPH can be contacted to obtain the most current list of NCDC recognized/recommended laboratories in the area.

Specific steps for obtaining, handling, storage and transportation of stool specimens are presented in the Shigellosis/Salmonellosis laboratory confirmation protocol in Section 10.10. Refer to Figure 32 at the end of this chapter for the instructions concerning collection and transportation of food specimens and interpretation of laboratory results.

10.11.3 Salmonellosis Case Notification Procedures and Forms.

Any clinical (probable) or confirmed case of salmonellosis identified by providers or isolation of *Salmonella* by any laboratory requires urgent notification of the CPH within 24 hours by any existing means of communication. General requirements are outlined in more detail in Chapter 4.

Providers of health services should report any cases of acute diarrhea meeting the clinical description of salmonellosis to the rayon CPH as “Diarrhea” specifying in brackets (Suspected Salmonellosis) on urgent case notifications.

During subsequent investigation, the rayon CPH will classify such cases as “Confirmed Salmonellosis” or “Unspecified Infectious Diarrheal Disease” and report them accordingly taking into account results of laboratory tests and investigation findings.

10.11.4 Salmonellosis Outbreak Investigation

Rapid identification and investigation of salmonellosis cases is important for the source and the mechanism of transmission to be identified so that measures can be taken to prevent further spread to other persons.

Note: A cluster of 3 clinical (probable) or confirmed cases of salmonellosis within 2 weeks in a given geographic territory requires an investigation by a rayon CPH epidemiologist in cooperation with facility health workers within 2 business days of notification.

The following steps are recommended in an investigation (see also Chapter 6):

a) Verify the outbreak, that is, that all cases meet the clinical description of salmonellosis, by reviewing medical records

b) By quick review of reported cases, ***determine time and place of exposure and the population at risk.***

c) Obtain a complete listing of the foods served (see Figure 32a). Survey cases and exposed healthy controls. ***Compare the attack rates for specific food items eaten and not eaten*** in sick and exposed healthy population**.** The implicated food item(s) will usually have the greatest attack rates. When healthy controls are not available, prepare a list of foods consumed by the cases. Implicated food items will usually be common to all cases.

d) Inquire about the origin of the incriminated food and the manner of its preparation and storage before serving. Look for food handling errors, such as unsafe raw ingredients, possible sources of contamination, and periods of inadequate refrigeration and heating that would permit growth of *Salmonella*.

Here is a list of sample questions you may need to ask health workers and/or cases to implement steps b-d:

- What date and time did the symptoms start?
- Where has the patient eaten in the 3 days before the symptoms started?
- What has the patient eaten in the 3 days before the symptoms started?
- Has the patient been in contact with animal feces (lives on a farm, has pets, cleaned a bird cage, etc.)?
- Does anyone living with the patient have symptoms of salmonellosis?

e) Search for additional cases if 3 or more cases occur in association with common exposure.

f) Collect specimens of feces and vomitus from up to 10-20 cases as well as any leftover suspected food (if the food was consumed in an organized setting or by a large number of households) and send for laboratory examination if this has not been done yet. Specific steps for obtaining, handling, storing and transporting stool specimens are presented in the Shigellosis/Salmonellosis laboratory confirmation protocol in Section 10.10. Refer to Figure 32 at the end of this chapter for the instructions concerning collection and transportation of food specimens and interpretation of laboratory results.

g) ***Culture stools of any household contacts who are involved in food handling, direct patient care, or care of young children*** in institutional settings ***or elderly people***.

h) ***Search for food handlers with symptoms of the disease, and collect stool specimens from them.***

i) Collect other data as envisioned in an cluster/outbreak investigation report for diarrheal diseases (the suggested templates are presented as Figure 31 in Section 10.10) and report about a food-borne bacterial intoxication (see Figure 32a).

j) Inform local health administration and other stakeholders about outbreak/group cases verbally or in a written form (e.g., share with them a *preliminary* investigation report).

k) Implement control and prevention measures (see next section).

l) Continue analyzing the data about the outbreak as described in the general part of the guidelines on a daily basis as new information on the outbreak development becomes available. The objective is to monitor the effectiveness of control measures.

m) Finalize the cluster investigation report (Figure 31), including data on food-borne bacterial intoxication (Figure 32a) and submit them to the regional CPH in two copies (the regional CPH will forward one copy to NCDC).

10.11.5 Salmonellosis Outbreak Control/Response

The main objective of control measures is to ensure that food for consumption is free of *Salmonella*.

1. Obtain a complete listing of the suspected foods served and embargo, under refrigeration, all foods still available.

2. Take measures to make sure that symptomatic individuals are excluded from food handling and from direct care of infants, elderly, immuno-compromised and institutionalized patients. Release to return to work handling food or inpatient care requires 2 consecutive negative stool cultures for *Salmonella* collected not less than 24 hours apart; if antibiotics have been given, the initial culture should be taken at least 48 hours after the last dose.

3. Educate known *Salmonella* carriers on the need for very careful hand-washing after defecating and before handling food and discourage them from handling food for others as long as they shed organisms.

4. Carry out concurrent disinfection of feces and soiled articles with a chlorine solution or other MoHLSA-recommended disinfectant. In communities with a modern and adequate sewage system, feces can be discharged directly into sewers without preliminary disinfection.

5. Educate food handlers and preparers about the importance of:

- Hand-washing before, during and after food preparation
- Refrigerating prepared food in small containers
- Thoroughly cooking all foodstuffs derived from animal sources, particularly poultry, pork, egg products and meat dishes
- Avoiding recontamination within the kitchen after cooking is completed
- Maintaining a sanitary kitchen and protecting prepared foods against rodent and insect contamination

6. Educate the public to avoid consuming raw, incompletely cooked, dirty or cracked eggs, unpasteurized milk and other diary products.

7. Recommend that respective authorities inspect for sanitation and adequately supervise abattoirs, food processing plants, feed blending mills and butcher shops.

8. Recommend that animal-derived foods prepared for animal consumption be adequately cooked to eliminate pathogens.

10.11.6 Recommended Scope of Analysis of Salmonellosis Surveillance Data to Be Performed by CPH

(See Chapter 5 for more details.)

The CPH should perform analysis of the following data:

- Salmonellosis incidence rate / number of cases by month, year, age group and geographic area (line graphs can facilitate observing trends and identify clusters of cases)

- Laboratory testing and confirmation rates
- Urgent notification and outbreak investigation rates

10.11.7 Principle Uses of Data for Decision Making at the Regional and Rayon Levels

The regional- and rayon-level CPHs will use the data primarily to accomplish the following:

- Monitor trends in disease incidence
- Detect and monitor outbreaks and epidemics for appropriate response
- Identify high-risk food, high-risk food practices, and high-risk populations to design specific interventions
- Monitor the effectiveness of control measures
- Guide the formation of food-related policies
- Evaluate and improve the performance of the surveillance system (e.g., reaction time for notification, case confirmation rate, outbreak investigation rate)

Figure 32. Instructions for the Collection and Transportation of Food and Water Specimens and Interpretation of Laboratory Results

Specimens of food and water should be submitted for testing if they are considered to be possibly implicated as a vehicle of the disease or outbreak (for example, based on the attack rate).

The general principles regarding collection of specimens are given here. However, always consider seeking advice from the laboratory on appropriate specimens to collect.

1. Collect specimens of suspect food at the earliest and place them in sterile containers.

a) If the food article is solid, cut it with a sterile knife and collect 100-200 grams of the sample from the center.

b) In case of liquids, first thoroughly shake the specimen to mix and then with the help of a sterile tube collect the specimen and shift into a sterile container.

c) In case of water, collect a minimum of one liter in sterile bottles provided by the laboratory.

2. All the specimens should be properly labeled and packed. Make sure the following details accompany the specimens:

- ✓ Identification of the case by name, address and circumstances of the incident;
- ✓ Information on the product/food (source, date of purchase, date of production);
- ✓ Suspect organism and clinical symptoms of illnesses attributed to the food
- ✓ Date specimens collected

3. Store samples chilled, ideally at 4^{o}C. Hot food should be cooled rapidly by putting the containers under cold running water and then held at 0-4^{o}C.

4. Transport specimens to the laboratory by the most rapid mode available. Perishable food should be kept at 2-8^{o}C. Samples should be packed in such a way that there is no spillage during transportation. The receiving laboratory should be pre-informed about the method of transport and anticipated time of receipt in the laboratory.

Interpretation of results:

- ✓ Correlate the isolate with epidemiological data before incriminating the causative agent.
- ✓ Organism is more likely to be the causative agent if the same organism (same serotype/phage type) is recovered both from suspect food and the clinical specimen taken from the patient.
- ✓ The source/mode of spread of the causative agent can often be ascertained if the agent is isolated from raw foods, food ingredients, equipment or food handlers or environment.
- ✓ Food is confirmed as a vehicle of toxic substance if organism or toxin (e.g., staphylococcal enterotoxin or botulinum toxin) is detected, even in the absence of any clinical specimen.

Figure 32a Annex Report about a Food-borne bacterial intoxication

Region ; Rayon/City ; Village ; 200_ year

Place of exposure (infection/ intoxication)*	Exposure (infection/ intoxication)		Age group of exposed population at risk, years						Age group of infected population						Lethal cases by age group					
	Date	Time	Total cases	Under 1	1- 4	5-14	15-59	>60	Total cases	Under 1	1- 4	5-14	15-59	>60	Total cases	Under 1	1- 4	5-14	15-59	>60
1																				
2																				
3																				

* Social events (wedding etc.), place of used drinking water

continue:

Date and time disease onset		Number of sick persons who have							Confirmation of causative agent Lab	Number of sick persons		Suspected food products		Number and type (strain) of causative agent	
First patient	Last patient	Nausea	Vomiting	Diarrhea	Abdominal cramps	Fever	Neurological symptoms	Cardio-vascular symptoms		Lab-investiga-ted	With positive result	Lab-investigated (List)	With positive result (List)	Isolated from patients	Isolated from suspected food products
1															
2															
3															

Director of center:
Epidemiologist:

Seal

List of exposed persons

#	First name, last name of probable infected persons	Age	Date of notification	Date of disease onset	Probable diagnosis	Symptoms by sequence of appearance (1st, 2nd, 3rd)								Result of lab. investigation	Outcome
						Nausea	Vomiting	Diarrhea	Abdominal cramps	Fever	Neurological symptoms	Cardio-vascular symptoms			

List of food products used by exposed persons in the outbreak

#	First name, last name of exposed persons	Infected or not	List of food and cooked products consumed by persons present at potential outbreak location												

Rate of exposure by type of used food

#	List of food products	number of persons consuming listed food				number of persons not consuming listed food			
		Infected	healthy	Total	Attack rate (%)	Infected	healthy	Total	Attack rate (%)

10.12 Acute Viral Hepatitis A

10.12.1 Rationale for Surveillance

Hepatitis A is a self-limited disease caused by the hepatitis A virus (HAV) that is transmitted from person-to-person via the fecal-oral route, typically by ingestion of feces-contaminated food or water. Direct person-to-person spread is common under poor hygienic conditions. Occasionally, HAV is also acquired through anal-oral sexual contact and blood transfusions.

The disease results in a liver failure and death in nearly 2 percent of clinically manifested cases in adults older than 50 years of age and approximately 0.2-0.3 percent of younger cases. It is also a significant cause of morbidity and socio-economic losses. On average, adults miss 30 days of work. For each hospitalized case, direct and indirect medical costs can sum up to 500-800 Lari or more.

Georgia is a country with intermediate endemicity of HAV infection. Most infections used to occur early in life with nearly all children infected with HAV before the age of 9. With improved sanitation and hygiene, infections are delayed and consequently the number of persons susceptible to the disease increases. Under these conditions explosive epidemics can arise from fecal contamination of a single source.

In Georgia approximately 2,500 HAV infections are reported annually (incidence rate 56 per 100,000 population). However, there is substantial underestimation of hepatitis A cases, because HAV infections of young children are mostly asymptomatic and therefore unrecognized. Less that 20 percent of cases are laboratory-confirmed.

Surveillance for this disease helps monitor incidence, detect outbreaks, identify contacts of case-patients for post-exposure prophylaxis, and contain spread.

Main strategies to prevent and control outbreaks of Hepatitis A include the following:

- Health education to improve hygiene and hand-washing behavior of population;
- Improved sanitation to ensure clean water sources, etc.
- Administration of Immune globulin for post-exposure prophylaxis

Cost-effectiveness studies have shown that where HAV immunity of adult population is 45 percent or less, routine Hepatitis A vaccination may be a strategy of choice. Since in Georgia HAV immunity is much higher, routine hepatitis A vaccination is not currently recommended.

10.12.2 Recommended Hepatitis A Case Definition

Clinical description: Any person who has an acute illness, typically including acute jaundice, dark urine, anorexia, malaise, fatigue, and right upper-quadrant tenderness. Biological signs include increased urine urobilinogen and usually >2.5 times the upper limit of serum alanine aminotransferase (ALT).

Note: The proportion of asymptomatic infections is variable.

Case classification

Clinical (probable) (unspecified acute viral hepatitis): A case that meets the clinical description above.

Confirmed: A case that has at least one of the following.

- IgM antibody to hepatitis A antigen (IgM anti-HAV) positive **or**
- A case compatible with the clinical description in a person who has an epidemiological link (a close contact with a lab-confirmed case during his/her period of communicability 15-50 days prior to the onset of symptoms) with a confirmed hepatitis A case.

Note: Positive IgG antibody to hepatitis A antigen (IgG anti-HAV) appearing in the convalescent phase of infection remains for the lifetime of the person, and confers enduring protection against the disease. *Detection of IgG anti-HAV alone indicates past infection.*

For patients negative for hepatitis A, further testing for a diagnosis of acute hepatitis B, C, D, or E is recommended.

Because the clinical picture for all acute viral hepatitis A through E is similar, only laboratory testing can reliably distinguish various etiological agents. Testing for as many markers as possible is therefore very important, because response measures depend on the type of hepatitis identified.

Laboratory testing is currently mandated for every clinical (probable) case of acute viral hepatitis (except for an outbreak of hepatitis A, where it is required to confirm at least one case, provided that all cases are epidemiologically linked or every case where such link cannot be established). The regional CPH can be contacted to obtain the most current list of NCDC recognized/recommended laboratories in the area.

10.12.3 Case Notification Procedures and Forms

Any clinical (probable) case of acute viral hepatitis identified by providers or a positive lab test for any hepatitis require urgent notification of the CPH within 24 hours by any existing means of communication. General requirements are outlined in more detail in Chapter 4.

10.12.4 Hepatitis A Case/Outbreak Investigation

Rapid identification and investigation of cases of acute hepatitis A is important for the source to be identified so that measures can be taken to prevent further transmission to other persons (e.g., post-exposure prophylaxis).

Note: A cluster of 3 or more probable cases of acute hepatitis during the same period consistent with viral Hepatitis A incubation period (15-50 days) in a given geographic territory requires an investigation by a rayon CPH epidemiologist in cooperation with facility health workers within 2 business days of notification.

The following steps are recommended in an investigation (see also Chapter 6):

a) Verify the outbreak on-site by reviewing medical records. Check if cases meet the case definition.

Collect serum specimens to confirm the evidence of acute liver disease (elevated aminotransferase levels) and determine its type if this has not been done previously. Specimen collection, storage and transportation procedures are specified in the PROTOCOL FOR LABORATORY CONFORMATION OF ACUTE VIRAL HEPATITIS given in Section10.6.

b) Carry out field visits, and interview health staff to identify the source of infection, the mode of transmission and collect other data as envisioned in an cluster/outbreak investigation report for diarrheal diseases (the suggested template is presented as Figure 31 in Section 10.10.)

c) Identify and prepare a list of contacts of cases who require post-exposure prophylaxis

- ✓ Close personal contacts (e.g., household, sexual)
- ✓ Children in day-care settings if one or more hepatitis A cases are recognized in children or employees of the setting
- ✓ Food handlers in the same establishment where a common source outbreak was recognized

d) Inform local health administration and other stakeholders about outbreak/group cases verbally or in a written form (e.g., share with them a preliminary investigation report)

e) Implement control and prevention measures (see next section).

f) Continue analyzing the data about the outbreak as described in the general part of the guidelines on a daily basis as the new information on the outbreak development comes. The objective is to monitor the effectiveness of control measures.

g) Finalize the cluster investigation report and submit it to the regional CPH in two copies (the regional CPH will forward one copy to NCDC).

10.12.5 Hepatitis A Outbreak Control/Response

An outbreak of acute viral hepatitis A requires the following control actions from the health facility and rayon CPH:

1. Eliminate any common sources of infection (if identified).

2. Make sure that sewage disposal and water distribution systems work properly. Alert sanitary and local authorities if problems are identified.

3. Advise patients on the importance and effectiveness of hand-washing after defecation as a means of curtailing transmission of the virus to contacts.

4. Educate the public about good sanitation and personal hygiene, with special emphasis on careful hand-washing and sanitary disposal of feces.

5. Recommend that **post-exposure prophylaxis** be carried out. A single intramuscular dose of Immune globulin (the dose is specified in a respective package insert), if administered within 2 weeks of exposure to population groups specified above, may help prevent or reduce the severity of the disease. However, it is of no help in the acute phase of hepatitis A.

Note 1: Persons who received one dose of hepatitis A vaccine at least 2 weeks before a HAV exposure do not need IG.

Note 2: Serologic screening of contacts of infected individuals for anti-HAV before they are given IG is not recommended because screening is more costly than IG and would delay its administration.

6. Certain population groups with increased risk of hepatitis A infection, such as household contacts of infected persons, personnel of medical, child care and food service settings, preschool children, persons with chronic liver disease and disorders requiring transfusion of blood products, injecting drug users, homosexually active men should be encouraged to consider medical consultation regarding a need to get hepatitis A vaccination at their own expense. Age breakdown of registered hepatitis A cases shows that transmission shifts to older age groups, which means that a decreasing proportion of population gets immunity in the childhood and thus they may be at risk.

Inactivated hepatitis A vaccines registered in Georgia may be used for both pre- and post-exposure prophylaxis.

10.12.6 Recommended Scope of Routine Analysis of Hepatitis A Surveillance Data to Be Performed by CPH

(See Chapter 5 for more details.)

The CPH should perform routine monthly analysis of the following data:

- Hepatitis A incidence rate by month, year, age group and geographic area (line graphs can facilitate observing seasonal and secular trends)
- Laboratory testing and confirmation rates
- Urgent notification and outbreak investigation rates

10.12.7 Principle Uses of Data for Decision Making at the Regional and Rayon Levels

The regional- and rayon-level CPHs will use the data primarily to accomplish the following:

- Monitor trends in disease incidence
- Detect outbreaks
- Determine the effectiveness of control measures
- Determine the epidemiologic characteristics of infected persons, including the source of their infection to guide policy development
- Evaluate and improve the performance of the surveillance system (e.g., reaction time for notification, case confirmation rate, outbreak investigation rate)

10.13 Cholera

10.13.1 Rationale for Surveillance

Cholera is a secretory diarrheal disease caused by enterotoxin-producing strains of *V. cholerae*. Although over 150 serogroups of *V. cholerae* have been identified, for decades toxigenic *V. cholerae* serogroup O1 was the only known cause of epidemic cholera. Serogroup O1 occurs as two biotypes – classical and El Tor – each of which occurs as 3 serotypes (Inaba, Ogawa and rarely Hikojima). After a large epidemic in Asia in 1992 and 1993, it became clear that toxigenic *V. cholerae* serogroup O139 also could cause epidemics very similar to those caused by *V. cholerae* O1. According to WHO, both *V. cholerae* O1 and O139 are now recognized causes of cholera and should be reported the same way. Isolates of non-O1 and non-O139 *V. cholerae* can cause illness, but they do not pose the public health threat.

The enterotoxin produced by *V. cholerae* O1 and O139 causes a massive outpouring of fluid and electrolytes into the bowel. This rapidly leads to profuse watery diarrhea, loss of circulation and blood volume, metabolic acidosis, potassium depletion, and ultimately vascular collapse and death. 75 percent or more of initial infections with *V. cholerae* O1 or O139 may be asymptomatic, depending on the infecting dose. Of the 25 percent of persons with symptomatic infections, most have mild illness. Approximately 5 percent of patients have moderate illness that requires medical attention but not hospitalization. In only about 2 percent of patients does the illness progress to life-threatening "cholera gravis". In such severe dehydrated cases death may occur within a few hours, and the case fatality rate may exceed 50 percent. With proper and timely rehydration, this can be less than 1%.

Cholera causes an estimated 120,000 deaths per year worldwide and is prevalent in 80 countries. The disease is acquired through ingestion of an infective dose of contaminated food or water. New outbreaks can occur sporadically in any part of the world where water supply, sanitation, food safety, and hygiene are inadequate. Although no cases of cholera have been reported in Georgia recently, the risk of cholera epidemics is intensified during manmade and natural disasters, such as conflicts and floods, and when large populations are displaced. Cases of cholera are also regularly imported into industrialized countries.

The current response to cholera in many countries is often reactive and takes the form of an emergency response with inadequate preparedness. Although these responses can prevent many deaths, they fail to prevent cholera cases on a long-term basis. ***Improvements in water supply and sanitation represent the most sustainable approach to protecting against cholera and other diarrheal diseases***.

WHO recommends the following approaches to control and prevent cholera outbreaks and manage epidemics more effectively:

- ***Improved surveillance*** to obtain better data for risk assessment and the early detection of outbreaks.
- ***Improved preparedness*** to provide a rapid response to outbreaks and limit their spread.
- ***Improved case management*** to reduce deaths among cases.
- ***Improved environmental management*** to enhance prevention.
- ***Health education*** focused on behavioral change.

10.13.2 Recommended Cholera Case Definition

Clinical description: severe dehydration or death from acute watery diarrhea in a patient aged 5 years[30] or more.

Case classification

- ***Clinical (probable)****:* A case that meets the clinical description of cholera
- ***Confirmed:*** A case that meets the clinical description of cholera that is laboratory confirmed (isolation of *Vibrio cholerae O1 or O139* from stools in any patient with diarrhea)

Note: In a cholera-threatened area, when the number of confirmed cases rises, shift should be made to using primarily the clinical case classification (see the laboratory testing recommendation below)

Laboratory testing is currently mandated for the first 5-10 clinical cases (if any are positive, then for every tenth case during the outbreak). Isolation of *Vibrio cholerae O1 or O139* must be confirmed by the NCDC.

The protocol for laboratory confirmation is given at the end of this chapter.

10.13.3 Cholera Case Notification Procedures and Forms.

Cholera is one of 3 diseases requiring notification under the International Health Regulation, because it has the potential to cause many deaths, to spread quickly and eventually internationally, and to seriously affect travel and trade.

Any clinical (probable) or confirmed case of cholera identified by providers or isolation of *Vibrio cholerae O1 or O139* by any laboratory requires ***immediate notification of the CPH within 1 hour*** by any existing means of communication.

General requirements are outlined in more detail in Chapter 4.

10.13.4 Cholera Outbreak Investigation

Rapid identification and investigation of cholera cases is important for the source and the mechanism of transmission to be identified so that measures can be taken to prevent further spread to other persons.

Note: A single clinical (probable) or confirmed cases of cholera requires an investigation led by the NCDC or a regional CPH epidemiologist in cooperation with rayon CPH and facility health workers as soon as possible but not later than 24 hours after notification.

[30] When cholera first appears in epidemic form in an unexposed population (e.g., in such countries as Georgia), it can affect all age groups, including children under 5 years; however, in children under 5 years of age, a number of pathogens can produce symptoms similar to those of cholera. To maintain specificity, therefore, children under 5 are not included in the case definition of cholera.

The following steps are recommended in an investigation (see also Chapter 6):

a) ***Verify that all cases meet the clinical description of cholera by reviewing medical records.***

b) Collect laboratory specimens if this has not been done yet (refer to the protocol at the end of this chapter).

c) ***In cooperation with health facilities, carry out active case finding*** on the affected territory by interviewing public in work, educational settings and residencies and establishing surveillance of persons who shared food and drink with a cholera patient in the preceding 5 days.

d) Collect data on cases as envisioned in a cluster/outbreak investigation report for diarrheal diseases (see Figure 31 in 10.10). The key is to identify and investigate potential "vehicles of transmission" (e.g, contaminated water, food) so that appropriate control measures can be taken.

e) Inform local health administration and other stakeholders about outbreak/group cases verbally or in a written form (e.g., share with them a preliminary investigation results).

f) Implement control and prevention measures (see next section).

g) Continue analyzing the data about the outbreak as described in the general part of the guidelines on a daily basis as the new information on the outbreak development comes. The objective is to monitor the effectiveness of control measures.

h) Responsibility for the final report preparation and dissemination belongs to the NCDC.

10.13.5 Cholera Outbreak Control/Response

A. Epidemic Measures:

Note: depending on the extent of the outbreak, a ***Cholera Coordination Committee*** composed of key national and local stakeholders may be established to coordinate response.

1. Inform the public – avoid rumor and panic by maintaining a very open and complete flow of information without delays. Designate a single spokesperson who will be the focal point for dealing with the media. Plan regular press releases and conferences. Establish a balance in terms of the kind of information to be disseminated (e.g., both the news and preventive/control measures for the population).

2. Conduct health education campaigns for the population emphasizing the need to wash hands with soap (particularly after taking care of patients – touching them, their stools, their vomit, or their clothes) and seek appropriate treatment without delay.

Key Messages to Give to the Community
- Come to the health care facility as soon as possible in case of acute watery diarrhea
- Start drinking oral rehydration solution (ORS) at home and during travel to the health care facility (See below for method of preparation)
- Wash your hands before cooking, before eating, and after using the toilet
- Cook food.
- Drink safe water.

Additional examples of appropriate health education messages are given in Section 10.10.5.

3. Advise health authorities that emergency stocks of basic supplies should be prepared/mobilized estimating that the attack rate might reach 2-3 percent of population.

4. Adopt emergency measures to ensure a safe water supply. Chlorinate public water supplies, even if the source of water appears to be uncontaminated (see more details on methods of water treatment in Section 10.10.5). Chlorinate or boil water used for drinking, cooking and washing dishes and food containers unless the water supply is adequately chlorinated and subsequently protected from contamination.

5. Ensure careful preparation and supervision of food and drinks. After cooking or boiling, protect against contamination by flies and unsanitary handling. Leftover products should be thoroughly reheated before ingestion. Persons with diarrhea should not prepare food or haul water for others.

6. Provide adequate safe facilities for sewage disposal.

B. Control of Patient and Contacts:

1. Isolation of severely ill patients is desirable. Less severe cases can be managed on an outpatient basis.

2. Carry out concurrent disinfection of feces, vomit and contaminated articles with a chlorine solution or any other disinfectant recommended by NCDC. In communities with a modern and adequate sewage system, feces can be discharged directly into sewers without preliminary disinfection. Disinfect corpses with 2 percent chlorine solution.

3. Establish a surveillance of persons who shared food and drink with a cholera patient for 5 days from last exposure in order to promptly detect the disease and refer them for treatment.

4. Rehydration with replacement of electrolytes lost is the mainstay of cholera treatment. Most patients with mild to moderate fluid loss can be treated entirely with ORS. Severe cases may need intravenous therapy and they might be given antibiotics.

How to Prepare Homemade ORS Solution
If ORS sachets are available: dilute one sachet in one liter of safe water
Otherwise: Add to **one liter** of **safe water**:
— Salt: 1/2 small spoon (3.5 grams)
— Sugar: 4 big spoons (40 grams)

5. Mass chemoprophylaxis is **not** effective in controlling a cholera outbreak and is **not** indicated.

6. Currently available cholera vaccines are **not** effective and are **not** recommended by WHO.

10.13.6 Recommended Scope of Analysis of Cholera Surveillance Data to be Performed by CPH

During outbreak the CPH should perform analysis of the following data:

- Number of cases/incidence rate by age, sex, geographical area
- Number of hospital admissions/ rate of hospitalization

- Number of deaths / case fatality rate

10.13.7 Principle Uses of Data for Decision Making at the Regional and Rayon Levels

The regional- and rayon-level CPHs will use the data primarily to accomplish the following:

- Detect outbreaks, estimate the incidence and case-fatality rate
- Undertake appropriately timed investigations
- Assess the spread and progress of the disease
- Plan for treatment supplies, prevention and control measures
- Determine the effectiveness of control measures

PROTOCOL FOR LABORATORY CONFIRMATION OF CHOLERA

Sampling strategy: Collect specimen from the first 5 to 10 suspected cases during the acute stage (two to four days after disease onset) and preferably before antimicrobial treatment. If any are positive, then collect every tenth case during the outbreak.

Confirmation test: Isolation of Vibrio cholerae O1 or O139

Specimen to be collected: Stool or rectal swab, if patient is not able to pass stool

Referral laboratory: NCDC

Important: Stool samples should reach the laboratory within 48 hours from collection

I. DOCUMENTATION

Supplies needed:

- ○ Register 60/A
- ○ Marker (water resistant)
- ○ Lab investigation request form
- ○ Specimen label

Steps:

a. Create a specimen label with patient's name, identification number, date, and time.

b. Fill in a copy of a lab investigation request form with patient information to accompany the specimen.

c. Make sure patient information has been entered in register 60/A and an urgent notification has been sent to CPH.

II. COLLECTION AND HANDLING

Supplies needed:

- ○ One tube of Cary Blair transport medium
- ○ Gloves
- ○ Leak-proof screw-cap container
- ○ Adhesive tape
- ○ Sterile cotton-tipped applicators (swabs)

If specimen can not reach the laboratory within 2 hours, Cary Blair transport medium should be used.

Steps:

1. If possible, chill the tube of Cary Blair medium by placing it in on ice packs in a refrigerator 1-2 hours before collecting the specimen
2. Put on gloves & wear them at all times when handling the specimen
3. Using a wooden spatula or plastic spoon, collect fresh stool (8-10g) including portions with blood and/or mucus. Place stool in a leak-proof sterile screw-cap container. Do not let stool dry out.
4. If a patient is not able to pass stool, take a rectal swab as follows:
   a) Remove the wrapper from the handle end of the sterile swab. Do not touch the tip of the swab
   b) Moisten the swab in chilled Cary Blair medium
   c) Insert the swab through the rectal sphincter 2-3 cm and gently rotate
   d) withdraw and examine the swab to make sure fecal material is visible on the tip
5. Transfer a small amount of the stool (or the rectal swab) to the bottom a tube of Cary Blair transport medium.
6. Break off the top portion of the stick so the cap can be tighly screwed onto the tube.
7. Make sure the tube is properly labeled (see Section I).
8. Safely dispose of all contaminated materials. Do not reuse.

III. STORAGE

Steps:

1. Immediately refrigerate at 4-8^{0}C.
2. Keep refrigerated until shipment.

IV. TRANSPORTATION

Supplies needed:

- ○ Ziplock plastic bag
- ○ Cold box with ice packs
- ○ Plastic container
- ○ Box label

Steps:

If the laboratory is nearby, specimens may be hand carried in an insulated box with ice packs, otherwise follow the following procedures:

1. Tighten the cap, apply waterproof sealing tape over the cap and top of specimen container.
2. Place specimen container in a suitably sized plastic bag (1st layer) together with a small amount of absorbent material, such as cotton wool. The bag must be sealed either using heated bag sealer or waterproof adhesive tape; as an alternative, use ziplock plastic bags. Specimens from different patients should never be sealed in the same bag.
3. Sealed bags containing the specimens should be placed inside plastic containers with screw-cap lids (2nd layer). Provided that specimens have been double-bagged properly in sealed plastic bags, specimens from several patients may be packed inside the same secondary plastic container. Additional absorbent material should be placed inside the container to absorb any leakage that may occur.
4. Sealed plastic containers should be fitted into insulated 3rd layer containers (e.g., a cold box). First, place ice packs at the bottom of the box, and, along the sides, place the plastic container with the specimen in the center, then place more ice packs on top. Make sure that the container is firmly fixed in the outer box.
5. Put the lab investigation request form in a plastic bag and place it in the outer box.
6. Label box with name, address, and telephone number of the referral laboratory and the sender.
7. Label box with the safety precautions ("Do not freeze," "Do not expose to heat," "This side up," "Biological specimen," etc.).
8. Arrange shipping date.
9. When arrangements are finalized, inform the recipient of time and manner of transport and make sure that package reaches referral laboratory within 2 days of specimen collection.

V. COMMUNICATING TEST RESULTS

Laboratory should communicate results to the clinician within 2-4 days of receiving the sample. If the result of the test is positive, it should also notify the rayon CPH.

Steps: 1. Record the results in the case history and Journal 60/A.

10.14 Bacterial Meningitis

10.14.1 Rationale for Surveillance

Meningitis is inflammation of membranes that cover the brain and spinal cord. Meningitis occurs in all ages, but is more common in children under 10 years of age.

Meningitis may be caused by various infectious agents (virus, fungi, bacteria, protozoa), which reaches the cerebral membranes. Bacterial meningitis is mostly caused by: ***Neisseria meningitides, Haemophilus influenzae***, ***Streptococcus pneumoniae*** and ***Mycobacterium tuberculosis.*** Among viral causes, the common agents are: Herpes simplex virus 1, polio, mumps and ECHO (human enterocytopatic) Koksak viruses. Among fungi: Cryptococcus.

Public health response to non-bacterial meningitis is limited. For example, lethal form of tuberculosis meningitis may be prevented by the BCG vaccination. The introduction of BCG vaccination in Georgia has significantly decreased the proportion of TB meningitis among all extrapulmonary TB cases.

Bacterial meningitis is a major cause of death and disability in Georgia: 120-200 cases of bacterial meningitis are estimated to occur in Georgia annually, 5-20 percent of them fatal. Nearly one-third of survivors are left with disability including neurological sequelae, mental retardation and deafness.

While studies in a number of countries have indicated that the etiological causes of bacterial meningitis vary considerably across geographic regions, *Haemophilus influenzae* serotype b (Hib) and *S. pneumonia* infections are often the leading causes of pediatric meningitis in unvaccinated populations. Among unvaccinated infants, the proportion of bacterial meningitis due to Hib can be as high as 50 percent, with *S. pneumonia* accounting for 30-40%. However, no reliable data currently exist about etiological causes of meningitis in Georgia.

Vaccines against many serogroups and serotypes of *N. meningitidis*, Hib, and *S. pneumoniae* are currently available and play an important role in the control and prevention of bacterial meningitis in some countries.

- Routine use of polysaccharide-protein Hib conjugate vaccines for immunization of infants has virtually eliminated Hib meningitis and other forms of severe Hib disease in developed countries. Starting in 2000, GAVI has supported the introduction of Hib vaccine in developing countries where the burden of disease warranted it.

- Heptavalent pneumococcal conjugate vaccines have been routinely used for immunization of children in the U.S. and Western European countries for several years resulting in dramatic reduction in the incidence of *Streptococcus pneumoniae* infections. In a recently completed field trial in Africa, a 9-valent vaccine reduced all cause mortality in children by 17 percent, and severe pneumonia by 37 percent. 23-valent pneumococcal polysaccharide vaccines are being used to prevent the disease in certain risk groups such as the elderly and in persons with chronic illnesses.

- Meningococcial polysaccharide vaccines are generally used in response to epidemics of meningococcal disease that are most common in those parts of the African continent often referred to as the “meningitis belt.” In 2005, a new tetravalent polysaccharide-protein

conjugate vaccine "Menactra" was licensed for use among persons aged 11-55 years in the U.S.

In order to make an informed decision about the need for a new vaccine introduction, the etiological causes of bacterial meningitis in Georgia need to be determined and the burden of disease that can be prevented by vaccination needs to be assessed. In the next 5-10 years, as such data become available, the Hib and other new vaccines may be considered for the inclusion in the Georgia immunization program.

Epidemiological and laboratory surveillance of bacterial meningitis will be introduced in Georgia starting in 2006 to study these issues, as well as to help detect outbreaks, and formulate and monitor the effectiveness of response measures.

10.14.2 Recommended Case Definition

Clinical description of meningitis:

Any person presenting with fever >38.0^{0}C, **and one or more** of the following

- Neck stiffness
- Severe unexplained headache
- Altered consciousness
- Other meningeal signs
- Neck pain and 2 or more of the following
  - photophobia
  - nausea
  - vomiting
  - abdominal pain
  - pharyngitis with exudates

Notes:

- Meningitis may be accompanied by clinical symptoms of the underlying infectious disease (such as TB, mumps, etc.)
- In patients less than two years of age, meningitis is suspected when fever is accompanied by bulging fontanels

Case classification

- ***Clinical (unspecified) meningitis***: A case that meets the clinical description above.
- ***Probable bacterial meningitis***: A case that meets the clinical description above with cerebral spinal fluid (CSF) examination showing at least one of the following:
  - turbid appearance
  - leukocytosis > 100 cells/mm^3

- leukocytosis 10-100 cells mm^3 AND either an elevated protein (>1.0 g/l) or decreased glucose* (<400mg/l)

  * CSF glucose level is normally 50-75% of blood glucose level

- ***Probable viral meningitis:*** A case that matches the clinical description above with CSF examination showing all of the following:
  - Normal glucose level
  - Normal protein or increased not significantly (>0,5 g/l)
  - Slightly elevated leikocytosis (<500 cells/mm3) with prevailing lympocytes (50 percent)

- ***Probable TB meningitis***: A case that matches the clinical description above with CSF examination showing all of the following:
  - CSF is received with high pressure
  - Leikocytosis (<500 cells/mm3) with prevailing lympocytes (on the initial stage of infection Polymorphonuclears may prevail)
  - Protein is elevated and glucose is dicreased

- ***Confirmed bacterial meningitis***: A case consistent with the clinical description above and identification of a bacterial pathogen (i.e., Hib, pneumococcus or meningococcus) in the CSF or blood by culture, antigen detection methods or by Gram stain.

- ***Confirmed viral meningitis***: A case that matches the clinical description above and has a proper titer of antibodies to the respective virus in CSF.

- ***Confirmed TB meningitis:*** A case that matches the clinical description above and identification of *Mycobacterium tuberculosis* in CSF.

10.14.3 Laboratory Testing for Meningitis Diagnosis

Every effort should be made to ensure that a lumbar puncture and a blood culture are included in the routine evaluation of people who present with symptoms of meningitis. Because the clinical picture for all meningitis is similar, only laboratory testing can reliably distinguish various etiological agents. Samples should be collected into 3 sterile tubes for various tests (see protocol at the end of this chapter).

Whenever possible, specimens for the isolation and identification of the organism should be sent to NCDC. Alternatively, the regional CPH can be contacted to obtain the most current list of NCDC recognized/recommended laboratories in the area.

An outline of the three methods for laboratory confirmation of meningitis are presented at the end of the chapter.

10.14.4 Case Notification Procedures and Forms

Any probable or confirmed cases of meningitis identified by providers or identification of a *Hib, pneumococcus or meningococcus* in the CSF or blood by any laboratory require urgent notification of

the CPH within 24 hours by any existing means of communication. General requirements are outlined in more detail in Chapter 4.

10.14.5 Meningitis Outbreak Investigation

Rapid identification and investigation of meningitis cases is important because measures can be taken to prevent further spread to other persons. While infections cased by *Hib* and *pneumococcus* do not have a substantial outbreak potential, infections with *N. meningitis* do. In the absence of a laboratory confirmation every single clinical or probable case of meningitis is considered an outbreak and requires an investigation by a rayon CPH epidemiologist in cooperation with facility health workers within 2 business days of notification.

The following steps are recommended in an investigation (see also Chapter 6):

a) Verify that cases meet the clinical description of meningitis by reviewing medical records

b) Ensure that a lumbar puncture and a blood culture are included in the routine evaluation of every person who presents with symptoms of meningitis. ***Assist with the transportation of laboratory specimens as required*** (refer to the protocol at the end of this chapter).

c) ***In the case of probable bacterial or confirmed bacterial meningitis caused by Neisseria meningitides, Haemophilus influenzae***, and ***Streptococcus pneumoniae***, ***Mycobacterium tuberculosis, collect data as envisioned in the bacterial meningitis investigation card*** (see **Figure 33**). If the diagnosis changes during the course of investigation, submit the updated investigation card.

d) ***Identify close contacts*** of probable and confirmed *N. meningitis* cases for whom prophylactic measures may be appropriate (see next section).

e) Analyze the data about the bacterial meningitis outbreak as described in the general part of the guidelines.

The emphasis should be on identifying population groups at highest risk.

f) ***Implement bacterial meningitis control and prevention measures*** (see next section).

g) Inform local health administration and other stakeholders about outbreak/group cases of bacterial meningitis verbally or in a written form.

h) ***Write a bacterial meningitis report*** and send it to the regional CPH in two copies (the region CPH will forward one copy to NCDC). This report should include:

- Bacterial Meningitis Investigation Card (see Figure 33) completed for each single case (number of cases in the card(s) should correspond to the number of cases indicated in the monthly report form)
- Cluster **Investigation Report of bacterial meningitis cases**, which is prepared for group cases (see Chapter 6 for recommendations)

Figure 33. Bacterial Meningitis Investigation Card

Registration # Date _____ Facility _____ Rayon _____

Is the information additional?		Yes No
1	Name	
2	Age (for children <1y indicate date of birth)	
30.	City, rayon, street address	
31.	Institutional setting?	Yes No Specify: _____
32.	Group case?	Yes No
33.	Date of disease onset	Day/ /month / /Year / /
34.	Date meningitis diagnosed for the first time	Day/ /month / /Year / /
35.	Date of notification to CPH	Day/ /month / /Year / /
36.	Date of investigation	Day/ /month / /Year / /
37.	Hospitalized when, where?	Day/ /month / /Year / / Hospital_____
38.	Types and dates of specimen collection	CSF? Yes No When? Day/ /month / /Year / / Blood? Yes No When? Day/ /month / /Year / /
39.	Date antibiotics started?	Day/ /month / /Year / / Before specimen collection? Yes No
40.	Outcome	Died, discharged When? Day/ /month / /Year / /
41.	Evidence of neurologic deficit, deafness or other sequelae at discharge (for survivors)	Yes No Unknown
42.	CSF evaluation results	Appearance: Clear / Cloudy / Bloody / Unknown Cell count: _____ % Neutrophils _____ Protein ____mg/dl Glucose____mg/dl Gram stain result: _____
43.	Specify bacteria identified from CSF or blood	o Organism_____ Serogroup/serotype____ o Pending o NO bacteria identified
44.	Detection method (circle all that apply):	CSF culture CSF latex Blood culture Other (specify)_____
45.	Final case classification	o Clinical/unspecified meningitis o Probable bacterial meningities o Confirmed bacterial meningitis o *Neisseria meningitidis* o *Hib* o *S. pneumoniae* o *M. tuberculosis* o *Other (specify)*_____

Control measures implemented:

1

2

3

3.

Comments/Conclusions:

Responsible person _____(name, position) Signature_____

Tel: _____ Address, fax, E-mail_____

The card should be submitted to the region CPH before day 5 and to NCDC (Tbilisi, 380077, st. M. Asatiani #9, Tel. 37-16-77.39-64-38) before day 7 of the next month **for each meningitis case.**

10.14.6 Bacterial Meningitis Outbreak Control/Response

An outbreak of bacterial meningitis requires the following control actions from the health facility and rayon CPH:

1. Administer respiratory isolation of cases for 24 hours after start of specific therapy.

2. Carry out close surveillance of household, daycare and other intimate contacts for early signs of illness, especially fever, to initiate appropriate therapy without a delay.

3. Recommend prophylactic administration of an effective chemotherapeutic agent to intimate contacts (e.g., household, close friends) and children contacts in day care centers. Mass chemoprophylaxis to control outbreaks of the disease is not recommended.

4. Educate the public on the need to reduce direct contact and exposure to droplet infection.

5. Consult NCDC on the need to use vaccine in case of a large outbreak caused by a bacterial agent.

10.14.7 Recommended Scope of Routine Analysis of Bacterial Meningitis Surveillance Data to Be Performed by CPH

(See Chapter 5 for more details.)

The CPH should perform routine monthly analysis of the following data:

- Number of clinical meningitis cases by month, year, age group and geographic area
- Case fatality ratio among clinical meningitis cases by age group
- Proportion of all clinical cases for which CSF/blood was obtained for evaluation (target >80 percent)
- Proportion of probable bacterial meningitis cases among all laboratory-tested clinical cases
- Proportion of all probable bacterial meningitis cases in which a bacterial pathogen was identified (target > 50 percent)
- Urgent notification and outbreak investigation rates

10.14.8 Principle Uses of Data for Decision Making at the Regional and Rayon Levels

The regional- and rayon-level CPHs will use the data primarily to accomplish the following:

- Monitor trends in disease incidence and the local disease burden (cases, deaths, disability)
- Timely detect outbreaks and identify causative pathogen
- Plan and monitor effectiveness of control measures

- Provide evidence for the need to modify immunization policies
- Evaluate and improve the performance of the surveillance system (e.g., reaction time for notification, laboratory confirmation rates, outbreak investigation rate)

Box 1. An Outline of the Three Methods for Laboratory Confirmation of Meningitis

1. Culture method: isolation of a bacterial pathogen from a normally sterile clinical specimen such as cerebrospinal fluid (CSF)

Standard media for bacterial agents: CSF should be inoculated in appropriate (i.e., specific) blood and chocolate agar or nutritive broth as soon as possible.

If clinical indications are present, CSF is cultivated for mycobacteria, fungi and ameba on special media.

2. Special investigations

a) Meningitis caused by *Neisseria meningitidis, Haemophilus influenzae or Streptococcus pneumoniae* may be simply confirmed by antigen detection in CSF. In urgent cases, latex agglutination and coagulation methods are used instead of immunophoresis.

b) Syphilis-associated meningitis (neurosyphilis) requires a positive serological reaction on syphilis in addition to a CSF serological investigation.

c) If a viral meningitis is suspected, antibody titers to respective viruses should be determined.

d) To detect fungi antigens: Latex aglutination test is more sensitive test for Cryptococcal meningitis than gram staining. Complement reaction is carried out when Coccidosis or Histoplasmosis is suspected.

3. Microscopic investigations of centrifuged CSF sediment

a) Gram stain results

b) Staining to detect acid-resistant bacteria (e.g. *Mycobacterium tuberculosis*). Likelihood of positive result increases with increased volume of testing material. For this purpose CSF sediment should be concentrated by gradually drying 4-5 drops on one section of the slide.

c) Cryptococcus investigation should be started by gram staining (Cryptococci look like large cocci). Further step for Cryptococcus capsules identification is ink staining.

d) Moist smears are used for Fungi and Ameba.

e) Investigation of neutrophils by polarized candles can detect fragments of keratin – which is the sign of a secondary chemical meningitis caused by dermoid cyst or penetration of craniopharingioma into CSF.

PROTOCOL FOR LABORATORY CONFIRMATION OF BACTERIAL MENINGITIS

Sampling strategy: Collect CSF (if patient is not contraindicated to lumbar puncture) AND blood specimens from every clinical case of meningitis before commencement of antimicrobial therapy. However, treatment must not be delayed pending lumbar puncture or blood collection.

Confirmation test: Isolation of a bacterial pathogen

Specimen to be collected: CSF and blood

Referral laboratory: Contact regional CPH office or NCDC for the list of approved laboratories

Important: CSF and blood samples should reach the laboratory within 24 hours for testing.

I. DOCUMENTATION

Supplies needed:

- ○ Register 60/A
- ○ Marker (water resistant)
- ○ Lab investigation request form
- ○ Specimen label

Steps:

1. Create a specimen label with patient's name, identification number, date, and time.
2. Fill in a copy of a lab investigation request form with patient information to accompany the specimen.
3. Make sure patient information has been entered in register 60/A and an urgent notification has been sent to CPH.

II. COLLECTION AND HANDLING

Supplies needed:

- ○ Sterile gloves, gown, towels, swabs, gauze pad
- ○ Alcohol 70%
- ○ Three small sterile screw-cap tubes
- ○ Local anestetic
- ○ Sterile needle and syringe
- ○ Povidone iodine 10%
- ○ Sterile lumbar puncture needle
- ○ Adhesive plaster
- ○ One vial of trans-isolate (T-I) transport medium
- ○ Blood culture bottle

Steps to collect CSF: **Lumbar puncture should be performed under sterile conditons by an experienced clinician. The description of this procedure is beyond the scope of this document.**

a. Collect 3 tubes of CSF (1-2ml per tube). Tube 1 is for staining. Tube 2 is for biochemistry. Tube 3 is for isolation and identification. If only one tube is obtained it should be given to the microbiology laboratory.

b. Transfer CSF from tube 3 into a vial of T-I transport medium if the specimen can not reach the laboratory within 1 hour

a) Remove a vial of T-I transport medium from the refrigerator 30 min in advance and allow the vial to warm to room temperature and the gelatin in the broth to liquify. Discard any vial showng visible growth or turbidity.

b) Lift off the small lid in the middle of the metal cap. Disinfect the exposed rubber stopper on the top of the vial with 70% alcohol.

c) Remove 1 ml of CSF from the tube using a new sterile needle and syringe and inject the CSF through the rubber stopper into the vial.

Steps to collect blood:

1. Collect blood for culture by venepuncture (adults 5-10ml; children 2-5ml; infants 0.5-2ml) using a sterile vacutainer or sterile needle and syringe.
2. Inoculate blood into blood culture bottle immediately to prevent the blood clotting in the syringe. If the culture bottle contains a diafragm, clean it with 70% alcohol before inoculating the medium.
3. Make sure the tubes, vials, bottles are properly labeled (see Section I).
4. Safely dispose of all contaminated materials and sharps.

III. STORAGE

Steps:

1. Keep tubes 1 and 2 with CSF refrigerated at 4-8^{0}C.
2. Keep the transport medium vial with the 3rd CSF specimen and the inoculated blood culture bottle at room temperature. If there is a delay in transport > 6 hours, uncubate the vial and the bottle at 35-37^{0}C.

IV. TRANSPORTATION

Supplies needed:

- ○ Gloves
- ○ Ziplock plastic bag
- ○ Plastic containers
- ○ Fibrebord/cardboord container
- ○ Box labels
- ○ Insulating material
- ○ Cold box with ice packs

Steps:

1. Tubes 1 and 2 for staining and biochemistry can be handcarried to the local laboratory in an insulated box with ice pack.

2. Vial with the 3rd CSF specimen and the blood culture bottle should be transported to the referral laboratory for isolation and identification at ambient temperature as follows:

Note: a picture illustrating the triple packaging system to maintain ambient temperature is provided on the next page (see Figure 34)

a) Tighten the cap, apply waterproof sealing tape over the cap and top of specimen container.

b) Place specimen container in a suitably sized plastic bag (1st layer) together with a small amount of absorbent material, such as cotton wool. The bag must be sealed either using heated bag sealer or waterproof adhesive tape; as an alternative, use ziplock plastic bags. Specimens from different patients should never be sealed in the same bag.

c) Sealed bags containing the specimens should be placed inside plastic containers with screw-cap lids (2nd layer). Provided that specimens have been double-bagged properly in sealed plastic bags, specimens from several patients may be packed inside the same secondary plastic container. Additional absorbent material should be placed inside the container to absorb any leakage that may occur.

d) Sealed plastic containers should be fitted into 3rd layer container (e.g., containers made of currugated fibrebord, cardbord, wood or other material strong enough to withstand the shock of handling and shipment)

e) Put the lab investigation request form in a plastic bag and place it in the outer box.

f) Label box with name, address, and telephone number of the referral laboratory and the sender.

g) Label box with the safety precautions ("Do not freeze," "Do not expose to heat," "This side up," "Biological specimen," etc.).

h) Arrange shipping date.

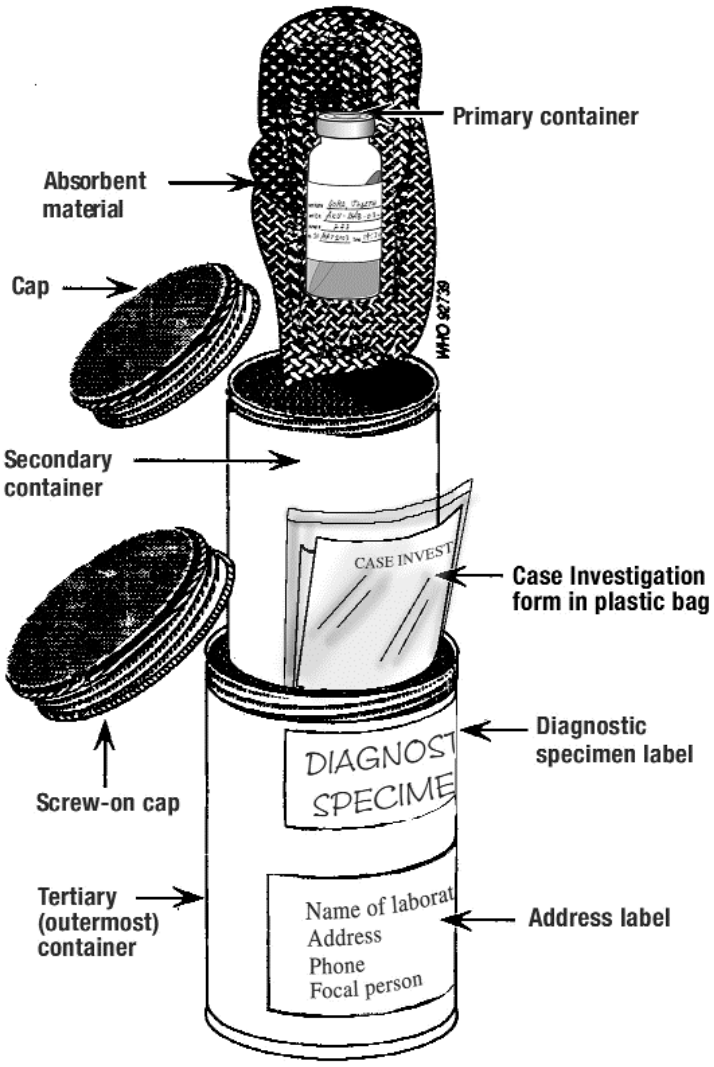
i) When arrangements are finalized, inform the recipient of time and manner of transport and make sure that package reaches referral laboratory within 1 day of specimen collection.

V. COMMUNICATING TEST RESULTS

Laboratory should communicate results to the clinician within 2-4 days of receiving the sample. If the result of the test is positive, it should also notify the rayon CPH.

Steps: 1. Record the results in the case history and Journal 60/A.

Figure 34. Illustration of the triple packaging system to maintain ambient temperature

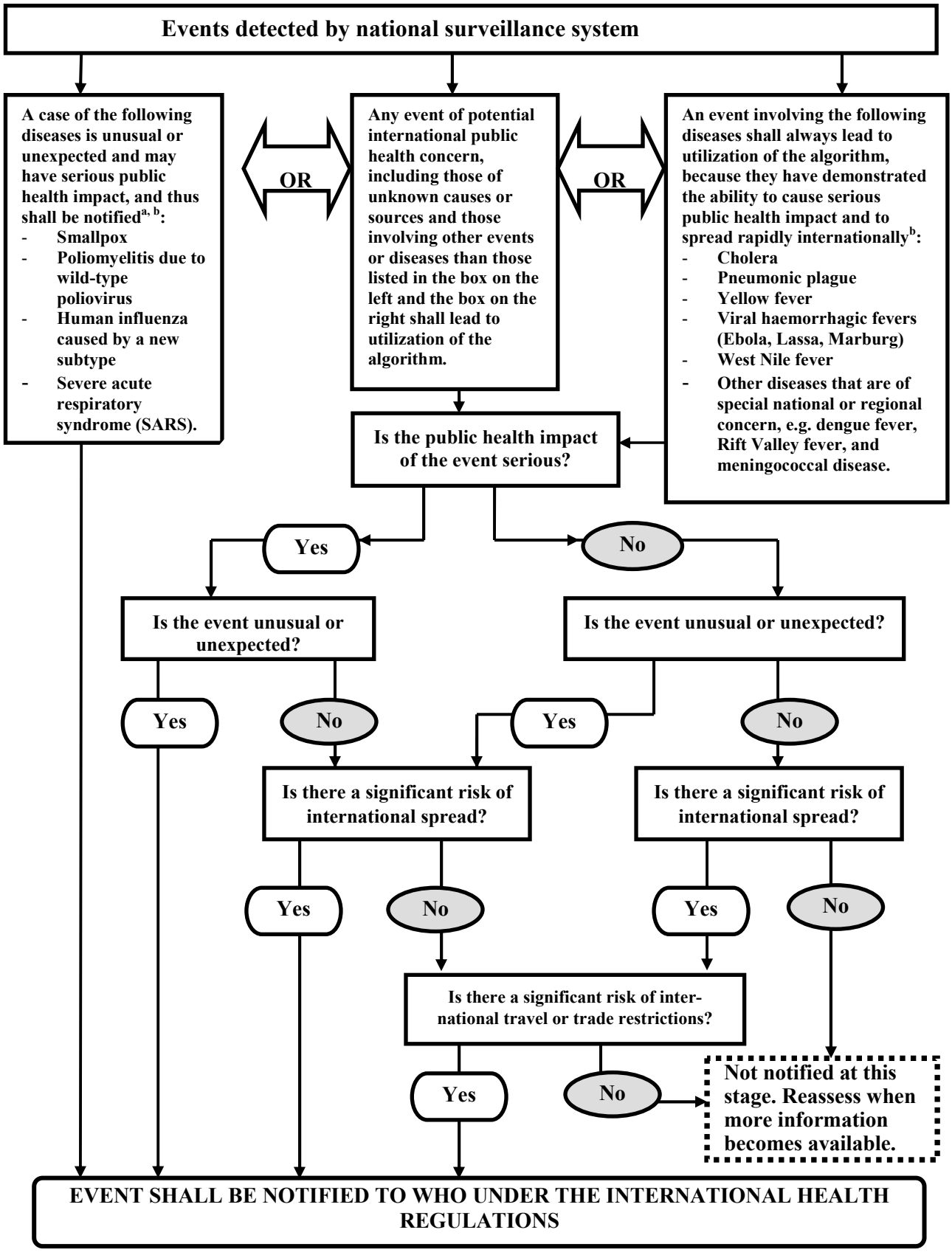


Annex A. WHO Decision Instrument for Assessment and Notification of Events of International Concern

Attached instrument from: World Health Organization, Fifty-Eighth World Health Assembly. 23 May 2005. Revision of the International Health Regulations. Agenda item 13.1, WHA 58.3

ANNEX A

DECISION INSTRUMENT FOR THE ASSESSMENT AND NOTIFICATION OF EVENTS THAT MAY CONSTITUTE A PUBLIC HEALTH EMERGENCY OF INTERNATIONAL CONCERN



[a] As per WHO case definitions.
[b] The disease list shall be used only for the purposes of these Regulations.

EXAMPLES FOR THE APPLICATION OF THE DECISION INSTRUMENT FOR THE ASSESSMENT AND NOTIFICATION OF EVENTS THAT MAY CONSTITUTE A PUBLIC HEALTH EMERGENCY OF INTERNATIONAL CONCERN

The examples appearing in this Annex are not binding and are for indicative guidance purposes to assist in the interpretation of the decision instrument criteria.

DOES THE EVENT MEET AT LEAST TWO OF THE FOLLOWING CRITERIA?

Is the public health impact of the event serious?	**I. Is the public health impact of the event serious?**
	1. *Is the number of cases and/or number of deaths for this type of event large for the given place, time or population?*
	2. *Has the event the potential to have a high public health impact?* THE FOLLOWING ARE EXAMPLES OF CIRCUMSTANCES THAT CONTRIBUTE TO HIGH PUBLIC HEALTH IMPACT: ✓ Event caused by a pathogen with high potential to cause epidemic (infectiousness of the agent, high case fatality, multiple transmission routes or healthy carrier). ✓ Indication of treatment failure (new or emerging antibiotic resistance, vaccine failure, antidote resistance or failure). ✓ Event represents a significant public health risk even if no or very few human cases have yet been identified. ✓ Cases reported among health staff. ✓ The population at risk is especially vulnerable (refugees, low level of immunization, children, elderly, low immunity, undernourished, etc.). ✓ Concomitant factors that may hinder or delay the public health response (natural catastrophes, armed conflicts, unfavourable weather conditions, multiple foci in the State Party). ✓ Event in an area with high population density. ✓ Spread of toxic, infectious or otherwise hazardous materials that may be occurring naturally or otherwise that has contaminated or has the potential to contaminate a population and/or a large geographical area.
	3. *Is external assistance needed to detect, investigate, respond and control the current event, or prevent new cases?* THE FOLLOWING ARE EXAMPLES OF WHEN ASSISTANCE MAY BE REQUIRED: ✓ Inadequate human, financial, material or technical resources – in particular: – Insufficient laboratory or epidemiological capacity to investigate the event (equipment, personnel, financial resources) – Insufficient antidotes, drugs and/or vaccine and/or protective equipment, decontamination equipment, or supportive equipment to cover estimated needs – Existing surveillance system is inadequate to detect new cases in a timely manner.
	IS THE PUBLIC HEALTH IMPACT OF THE EVENT SERIOUS? **Answer "yes" if you have answered "yes" to questions 1, 2 or 3 above.**

Is the event unusual or unexpected?	**II. Is the event unusual or unexpected?**
	4. *Is the event unusual?* THE FOLLOWING ARE EXAMPLES OF UNUSUAL EVENTS: ✓ The event is caused by an unknown agent or the source, vehicle, route of transmission is unusual or unknown. ✓ Evolution of cases more severe than expected (including morbidity or case-fatality) or with unusual symptoms. ✓ Occurrence of the event itself unusual for the area, season or population.
	5. *Is the event unexpected from a public health perspective?* THE FOLLOWING ARE EXAMPLES OF UNEXPECTED EVENTS: ✓ Event caused by a disease/agent that had already been eliminated or eradicated from the State Party or not previously reported.
	IS THE EVENT UNUSUAL OR UNEXPECTED? **Answer "yes" if you have answered "yes" to questions 4 or 5 above.**

Is there a significant risk of international spread?	**III. Is there a significant risk of international spread?**
	6. *Is there evidence of an epidemiological link to similar events in other States?*
	7. *Is there any factor that should alert us to the potential for cross border movement of the agent, vehicle or host?* THE FOLLOWING ARE EXAMPLES OF CIRCUMSTANCES THAT MAY PREDISPOSE TO INTERNATIONAL SPREAD: ✓ Where there is evidence of local spread, an index case (or other linked cases) with a history within the previous month of: – international travel (or time equivalent to the incubation period if the pathogen is known) – participation in an international gathering (pilgrimage, sports event, conference, etc.) – close contact with an international traveller or a highly mobile population. ✓ Event caused by an environmental contamination that has the potential to spread across international borders. ✓ Event in an area of intense international traffic with limited capacity for sanitary control or environmental detection or decontamination.
	IS THERE A SIGNIFICANT RISK OF INTERNATIONAL SPREAD? **Answer "yes" if you have answered "yes" to questions 6 or 7 above.**

Risk of international restrictions ?	**IV. Is there a significant risk of international travel or trade restrictions?**
	8. *Have similar events in the past resulted in international restriction on trade and/or travel?*
	9. *Is the source suspected or known to be a food product, water or any other goods that might be contaminated that has been exported/imported to/from other States*?
	10. *Has the event occurred in association with an international gathering or in an area of intense international tourism?*
	11. *Has the event caused requests for more information by foreign officials or international media?*
	IS THERE A SIGNIFICANT RISK OF INTERNATIONAL TRADE OR TRAVEL RESTRICTIONS? **Answer "yes" if you have answered "yes" to questions 8, 9, 10 or 11 above.**

States Parties that answer "yes" to the question whether the event meets any two of the four criteria (I-IV) above, shall notify WHO under Article 6 of the International Health Regulations.

Annex B. Codes for Administrative Levels in Georgia

Instruction for Epidemiological Number

Each CPH that carries out epidemiological investigation of cases and completes investigation forms for rubella, measles, and AFP/polio should give a different code to each case (see specific graph in the forms "epidnumber").

Rules for defining an epidemiological number:

- First three letters indicate state code – GEO (already indicated in the cards);
- Following three numbers represent the region (from 4th including 6th sign);
- Following three numbers represent the rayon (from 7th including 9th);
- 10th and 11th numbers mean year;
- 11th, 12th and 13th numbers represent number in given calendar year, in the rayon;
- Starting from 14th the signs should be given to AFP/polio contacts if samples are collected (indicated in the form attached to samples for testing) and the 14th sign should be letter **"C"** (Contact);
- The 15th sign (presented in increasing numbers: e.g., 1 for the first, 2 for second, etc.) should be given to AFP/polio contacts if samples are collected.

For example:

If measles case number 8 was registered in 2005 in Sachkhere rayon, the epidnumber of this case would be as follows: GE0 (Georgia) 004 (Imereti region) 006 (Sachkhere rayon) 05 (year) 008 (case); accordingly, the epidnumber of this case would be GE0 00400605008.

If the first AFP/polio case was registered in Batumi in 2006, the number of this case would be GE0 (Georgia) 002 (Adjara region) 001 (Batumi) 06 (year) 001 (case); accordingly, the epidnumber of this case would be GE0 00200106001.

If sample from the AFP/polio contact was sent for laboratory testing, epidnumber in the **sample lab. form** would be GE0 002 (Adjara region, 001 (Batumi) 06 (year) 001 (case) C (contact) 1 (# of contact); accordingly, the epidnumber of this contact person would be GE0 00200106001 C1.

List of Codes for Administrative Levels In Georgia

Region	country code	region code	rayon code	rayon
Abkhazia	GEO	GEO001	GEO001001	Gagra
Abkhazia	GEO	GEO001	GEO001002	Gali
Abkhazia	GEO	GEO001	GEO001003	Gudauta
Abkhazia	GEO	GEO001	GEO001004	Gulripshi
Abkhazia	GEO	GEO001	GEO001005	Ochamchire
Abkhazia	GEO	GEO001	GEO001006	Sokhumi
Abkhazia	GEO	GEO001	GEO001007	Tkvarcheli
Adjara	GEO	GEO002	GEO002001	Batumi
Adjara	GEO	GEO002	GEO002002	Keda
Adjara	GEO	GEO002	GEO002003	Khelvachauri
Adjara	GEO	GEO002	GEO002004	Khulo
Adjara	GEO	GEO002	GEO002005	Kobuleti
Adjara	GEO	GEO002	GEO002006	Shuakhevi
Guria	GEO	GEO003	GEO003001	Chokhatauri
Guria	GEO	GEO003	GEO003002	Lanchkhuti
Guria	GEO	GEO003	GEO003003	Ozurgeti
Imereti	GEO	GEO004	GEO004001	Bagdati
Imereti	GEO	GEO004	GEO004002	Chiatura
Imereti	GEO	GEO004	GEO004003	Kharagauli
Imereti	GEO	GEO004	GEO004004	Khoni
Imereti	GEO	GEO004	GEO004005	Kutaisi
Imereti	GEO	GEO004	GEO004006	Sachkhere
Imereti	GEO	GEO004	GEO004007	Samtredia
Imereti	GEO	GEO004	GEO004008	Terdjola
Imereti	GEO	GEO004	GEO004009	Tkibuli
Imereti	GEO	GEO004	GEO004010	Tskaltubo
Imereti	GEO	GEO004	GEO004011	Vani
Imereti	GEO	GEO004	GEO004012	Zestaphoni
Kakheti	GEO	GEO005	GEO005001	Akhmeta
Kakheti	GEO	GEO005	GEO005002	Dedoplis tskaro
Kakheti	GEO	GEO005	GEO005003	Gurdjaani
Kakheti	GEO	GEO005	GEO005004	Kvareli
Kakheti	GEO	GEO005	GEO005005	Lagodekhi
Kakheti	GEO	GEO005	GEO005006	Sagaredjo
Kakheti	GEO	GEO005	GEO005007	Signagi
Kakheti	GEO	GEO005	GEO005008	Telavi
Kvemo Kartli	GEO	GEO006	GEO006001	Bolnisi
Kvemo Kartli	GEO	GEO006	GEO006002	Dmanisi
Kvemo Kartli	GEO	GEO006	GEO006003	Gardabani
Kvemo Kartli	GEO	GEO006	GEO006004	Marneuli
Kvemo Kartli	GEO	GEO006	GEO006005	RusTavi
Kvemo Kartli	GEO	GEO006	GEO006006	Tetri tskaro
Kvemo Kartli	GEO	GEO006	GEO006007	Tsalka
Mtskheta-Mtianeti	GEO	GEO007	GEO007001	Akhalgori
Mtskheta-Mtianeti	GEO	GEO007	GEO007002	Dusheti
Mtskheta-Mtianeti	GEO	GEO007	GEO007003	Kazbegi
Mtskheta-Mtianeti	GEO	GEO007	GEO007004	Mtskheta
Mtskheta-Mtianeti	GEO	GEO007	GEO007005	Tianeti
Racha-Lechkhumi-Kvemo Svaneti	GEO	GEO008	GEO008001	Ambrolauri
Racha-Lechkhumi-Kvemo Svaneti	GEO	GEO008	GEO008002	Lentekhi
Racha-Lechkhumi-Kvemo Svaneti	GEO	GEO008	GEO008003	Oni
Racha-Lechkhumi-Kvemo Svaneti	GEO	GEO008	GEO008004	Tsageri
Samegrelo – Zemo Svaneti	GEO	GEO009	GEO009001	Abasha
Samegrelo – Zemo Svaneti	GEO	GEO009	GEO009002	Chkhorotsku
Samegrelo – Zemo Svaneti	GEO	GEO009	GEO009003	Khobi
Samegrelo – Zemo Svaneti	GEO	GEO009	GEO009004	Martvili
Samegrelo – Zemo Svaneti	GEO	GEO009	GEO009005	Mestia

Samegrelo – Zemo Svaneti	GEO	GEO009	GEO009006	Poti
Samegrelo – Zemo Svaneti	GEO	GEO009	GEO009007	Senaki
Samegrelo – Zemo Svaneti	GEO	GEO009	GEO009008	Tsalendjikha
Samegrelo – Zemo Svaneti	GEO	GEO009	GEO009009	Zugdidi
Samtskhe-Djavakheti	GEO	GEO010	GEO010001	Adigeni
Samtskhe-Djavakheti	GEO	GEO010	GEO010002	Akhalkalaki
Samtskhe-Djavakheti	GEO	GEO010	GEO010003	Akhaltsikhe
Samtskhe-Djavakheti	GEO	GEO010	GEO010004	Aspindza
Samtskhe-Djavakheti	GEO	GEO010	GEO010005	Borjomi
Samtskhe-Djavakheti	GEO	GEO010	GEO010006	Nino tsminda
Shida Kartli	GEO	GEO011	GEO011001	Gori
Shida Kartli	GEO	GEO011	GEO011002	Djava
Shida Kartli	GEO	GEO011	GEO011003	Kareli
Shida Kartli	GEO	GEO011	GEO011004	Kaspi
Shida Kartli	GEO	GEO011	GEO011005	Khashuri
Shida Kartli	GEO	GEO011	GEO011006	Tskhinvali
Tbilisi	GEO	GEO012	GEO012000	Tbilisi